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DISEASES

of the

RECTUM, ANUS, AND COLON

Including the

ILEOCOLIC ANGLE, APPENDIX, COLON,
SIGMOID FLEXURE, RECTUM, ANUS,
BUTTOCKS, AND SACROCOCCYGEAL REGION

BY

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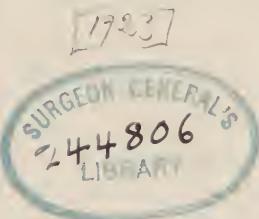
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VOLUME II

PHILADELPHIA AND LONDON

W. B. SAUNDERS COMPANY



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DISEASES OF THE ANUS, RECTUM, AND COLON

Chapter XXXVI

Hemorrhage of the Rectum and Anus

METHODS OF CONTROLLING

HAVING considered bleeding of the upper *alimentary tract, stomach, small intestine, colon, and sigmoid flexure* elsewhere, it remains for the author to discuss *anorectal hemorrhage* here.

General Remarks.—Bleeding from the rectum may be slight, moderate, or alarming, and evacuated blood may be *bright red, coffee grounds, or black*—melena—in color.

In some cases a large amount of blood is lost in a few minutes, while in others bleeding is slight, but frequent or continuous, and several hours, days, or weeks may elapse before alarming symptoms ensue.

Hemorrhage is a common manifestation of anorectal disease, and in the average case is harmless except that it makes the patient nervous or slightly anemic. In rare instances, where as a result of ulcers, malignant or other lesions, or operations, large vessels are eroded or injured, bleeding is sometimes serious and the patient becomes markedly exsanguinated, but fatal rectal hemorrhage is probably rare, since the author never lost a patient from it.

Hemorrhage is designated as *external—visible*—when blood can be seen escaping from the rectum or perianal region, and *internal—invisible*—when concealed.

External bleeding is a frequent complication of operations for rectal carcinoma, hemorrhoids, fissure, fistula, cryptitis, polyps, ulcers, hypertrophied papillæ, and other lesions of the lower anal canal, and invisible hemorrhage may result from these same procedures when the terminal rectum or anus is tightly blocked and blood cannot escape.

Internal hemorrhage may be induced by lesions in the mucosa, or secondary to operations performed upon the *movable upper or fixed rectum, anal canal*, and is more dangerous, since, the dressings

not being saturated, it is usually not suspected until the patient exhibits alarming general symptoms.

Operative anorectal hemorrhage may be classified according to the time it occurs, as—1, *primary*; 2, *recurrent*; 3, *secondary*, and 4, *late*.

Primary hemorrhage occurs during or immediately following operation, and is serious when a large vessel has been injured, but when caused by capillary oozing, though maybe difficult to control, seldom endangers the patient's life.

Recurrent hemorrhage takes place from several to thirty-six hours following operation, and is usually caused by the patient's withdrawing dressings while semiconscious, slipping or untying of a ligature, pulling apart of cauterized hemorrhoidal stump edges during vomiting or straining, or complete opening of a vein or artery injured before the dressings were applied.

Secondary hemorrhage is venous more often than arterial, and encountered from two to fourteen days subsequent to operative procedures; it most often occurs between the fourth and fifth day, is traceable to infection, sloughing away of cauterized tissue, breaking down of vessels injured by forceps or other instruments, cutting out of ligatures around vessels which have not been occluded by thrombi, or to pressure necrosis induced by packing left in the rectum for several days.

Late hemorrhage from anorectal wounds may be encountered weeks or months following operation, resulting from violent exercise, cauterization, traumatization, injury incident to digital or proctoscopic examination, topical applications, divulsion of the anus or rectum with bougies, dilators, or the fingers, careless probing, or evacuation of large or small hard fecal masses before wounds have healed.

Primary, recurrent, secondary, and late hemorrhage may be *slight, moderate, or profuse*, hinging upon the size and number of vessels participating in the bleeding.

PATHOLOGY

Rectal hemorrhage may be caused by (1) foreign bodies, (2) injuries, (3) anorectal disease, (4) operations, and (5) postoperative treatment.

Foreign bodies vary in character, shape, size, density, and weight; frequently reach the rectum through being swallowed or introduced from below, but rarely induce bleeding except when very large and rough, pointed, or have sharp or jagged edges.

The author has treated several minor and three alarming hemorrhages caused by passage of foreign bodies through the colon or rectum.

Injuries of the rectum and anus are quite common, and bleeding from this source may be slight, moderate, profuse, or in rare instances fatal. The different ways in which the anorectal region may be injured have been fully discussed elsewhere.

Local Diseases.—Fresh or clotted blood may appear in stools, the result of disease in any segment of the gastro-intestinal tract—see chapter on Gastro-intestinal Hemorrhage—but lesions responsible for bleeding are located in the rectum very much more frequently than higher up.

Named in order of their importance, the following are the affections most frequently responsible for slight, moderate, or profuse anorectal bleeding:

- | | |
|--------------------------------------|--|
| 1. Internal hemorrhoids. | 10. Hemorrhagic proctitis. |
| 2. Proctitis. | 11. Procidentia recti. |
| 3. Fissure in ano. | 12. Cryptitis. |
| 4. Ulceration. | 13. Condylomata. |
| 5. Constipation and fecal impaction. | 14. Fistula. |
| 6. Cancer. | 15. Villous tumors. |
| 7. Polyps. | 16. Diverticula. |
| 8. Stricture. | 17. Invagination of the sigmoid flexure into the rectum. |
| 9. Capillary varicosities. | 18. Miscellaneous affections. |

Internal hemorrhoids bleed slightly from *superficial*, which involve small, and profusely from *deep* ulcers (Fig. 317) that injure large vessels. As a rule bleeding from piles is venous, occurs during and immediately following an evacuation—from straining—and may continue a moment or for hours, and the amount of blood lost may vary from a few drops to $\frac{1}{2}$ pint or more. Generally hemorrhage is arrested by replacing hemorrhoids above the sphincter, and blood lost is unimportant except in neglected cases, where bleeding is permitted to go on daily for weeks, months, or years, until the patient is anemic or almost completely exsanguinated.

Proctitis (catarrhal) (Fig. 362) is a frequent cause of bleeding, but symptoms from it are never alarming, since blood comes from erosions, through which it oozes intermittently or is driven by feces during defecation. Ordinarily the only evidence of bleeding is a smear or streak of blood on the feces; but when ulcers form, mixed infection complicates proctitis, small or considerable amounts of blood may be lost.

Fissure in ano (Fig. 191) is invariably accompanied by slight bleeding during defecation and blood is seen as a single long streak on the fecal bolus, bright red drops upon the excrement or as a smear on toilet paper.

Ulceration (Fig. 93) of the rectum, anal canal, or both, at one time or another causes bleeding which may be insignificant or alarming, depending on the number and size of veins or arteries involved. In such cases ulcers may be tubercular, syphilitic, entamebic, balantidic, chancroidal, or sequelæ of incompletely healed wounds induced by accidental injury or operation.

Constipation and fecal impaction occasionally induce rectal hemorrhage, and bleeding occurs from lacerations in the mucosa made by passage of hardened fecal accumulations—scybalæ—or from stercoral ulcers resulting from pressure necrosis, caused by retained hard fecal masses.

Cancer of the rectum and anus is characterized by frequent slight or occasional profuse hemorrhages after the neoplasm degenerates and deep crater-like ulcers form.

Polyps (Fig. 522) that remain above the sphincter seldom bleed, but when they attain considerable size, become fragile, and protrude, bleeding ensues, since their frequent replacement causes the formation of erosions, ulcers, or part or all of the growth breaks off.

Stricture of the rectum (Fig. 522) is characterized by a discharge composed of admixed blood, pus, and mucus; but annoying or profuse bleeding is a rare complication except when induced by the evacuation of scybalæ, introduction of the finger, proctoscope, speculum, bougie or dilator, divulsion, or division of the stenosis.

Capillary varicosities of the anal canal are not uncommon, and when present are a constant source of bleeding which is augmented by defecation.

Such varices (Fig. 311) differ from hemorrhoidal tumors in that they are more numerous, and are seen as diminutive, bluish, granulation-like swellings involving areas in the mucosa, which, when they ulcerate, coalesce and form single or multiple denuded varicose patches of considerable size. Capillary varicosities may be independent or associated with hemorrhoids, syphilis, tuberculosis, or arteriosclerosis, and require special treatment, otherwise daily bleeding continues indefinitely after complicating affections have been cured.

Hemorrhagic proctitis is characterized by a thickened liver-colored mucosa, disfigured by numerous punctate ulcers (Fig. 362) that bleed upon the slightest provocation. This condition may be

confined to the rectum, or involve the bowel from the anus to ileocecal valve, in which case feces may contain fresh blood incident to defecation, and clotted, the result of hemorrhages from the colon or sigmoid.

Procidentia recti may be accompanied by slight or copious bleeding during and following stool in aggravated cases where the gut frequently or continuously protrudes and becomes ulcerated (Fig. 384) from rough handling and infection.

Cryptitis (Fig. 91) is responsible for a slight amount of blood upon the feces in rare instances where the mucous lining of crypts is



Fig. 362.—Hemorrhagic proctitis. Note numerous sponge-like areas through which blood constantly exudes during straining or passage of feces over them.

ulcerated, or an abscess or fistula finds an outlet through a rectal pocket.

Condylomata (lata or acuminata) (Fig. 488) in the anal canal, at the mucocutaneous juncture or upon the perianal skin, occasionally form masses that degenerate into superficial ulcers, or they may be broken off during defecation, and in either case bleeding may ensue.

Fistula (ordinary) (Figs. 92, 238) seldom bleeds except when probed or encroached upon by syphilitic, chancreoidal, or other types of ulceration, and in either case hemorrhage is unimportant.

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Villous tumors are exceedingly rare, and invariably cause daily slight or profuse bleeding.

Diverticula are occasionally encountered in the rectum, but never bleed except when the sac is ulcerated, an irregular-shaped or pointed foreign body lodges in it, or the diverticulum ruptures as a result of pus, gas, or fecal distention.

Invagination of the sigmoid flexure into the rectum is often associated with obstipation and erosions caused by sliding up and down of the gut through the narrow rectosigmoidal juncture, and in such cases slight hemorrhages may be caused by evacuations accompanied by straining.

Miscellaneous diseases—arteriosclerosis, pellagra, colonic chromatosis, amyloid degeneration, locomotor ataxia, infectious diseases of children, and circulatory affections—are occasionally indirectly or directly responsible for gastro-intestinal and rectal hemorrhage.

Operative and Postoperative Causes of Hemorrhage.—The majority of profuse and alarming hemorrhages of the rectum are due to faulty operations, failure to control bleeding when vessels are injured, improper drainage, and bad postoperative management of patients.

Below the author has enumerated the most common causes of bleeding from these sources, viz.:

1. Ignorant and unnecessary cutting.
2. Failure to ligate or crush spurting vessels.
3. Bruising and tearing fragile mucosa or diseased tissue with artery forceps or instruments.
4. Omitting to tie ligatures securely or clipping ligature ends so short that they untie (especially catgut that swells).
5. Removing tissue so close to ligatures that they slip off the stump.
6. Employing cutting-edged instead of round needles for anorectal surgery.
7. Careless divulsion of an ulcerated or strictured anal canal or upper rectum with the fingers, bougies, or instrument.
8. Introduction of the hand into the rectum during examination.
9. Substituting general (which is often responsible for vomiting, straining, and withdrawal of dressings by the semiconscious) for local anesthesia in anorectal operations.
10. Omitting to pack the upper rectum tightly when there is oozing or profuse bleeding from a high ulcer, cancer, or wound.
11. Failure to place a large firm gauze plug in the anal canal following operations in this region when there is danger of post-operative hemorrhage.

12. Attempting to arrest bleeding by closing wounds in fragile or degenerated tissue with sutures instead of packing.
13. Seizing and pulling down high rectal structures for examination or operation.
14. Blindly stabbing, instead of exposing and properly operating on anorectal abscesses through a large roomy speculum.
15. Unnecessary probing of ulcers and fistula wounds before, during, and subsequent to operation.
16. Pushing drains and packing into wounds or the rectum with probe, grooved director, scissors, or other thin or pointed instrument, which upon pressure is prone to slip through gauze and injure the bowel.
17. Introducing large specula and stretching the rectum after the operation has been completed to see if everything is satisfactory.
18. Dilating an ulcerated or strictured rectum with the fingers, Wales' bougie, or mechanical dilators.
19. Packing the movable instead of the fixed rectum—anal canal—to arrest bleeding following operations for fissure, fistula, hemorrhoids, and polyps, cryptitis and papillitis.
20. Omitting to place a firm pyramidal compress (Fig. 365, insert) over the anus before the T-binder (Fig. 365) is tightly adjusted.
21. Carelessness in not seeing dressings are snugly in place after the patient has been placed in bed.
22. Failing to thoroughly cauterize tissues *during clamp and cautery* operations for hemorrhoids, polyps, and procidentia recti.
23. Sponging or manipulating hemorrhoidal stumps subsequent to cauterization.
24. Irrigating the rectum or introducing the speculum or proctoscope following anorectal operations.
25. Frequent or careless cauterization of ulcers and wounds with acids, the Paquelin or electric cautery.
26. Failure to quiet restless patients and support the anus with compress during straining or severe vomiting or shortly following anorectal operations.
27. Administering cathartics that will bring about frequent fluid evacuations and tenesmus.
28. Prescribing an opiate to tie up the bowel following operation which favors the formation of large hard fecal masses that tear wounds open when evacuated.
29. Early postoperative administration of enemata and irrigations, and employment of imperfect tubes and syringe nozzles.
30. Unnecessary probing of rectal wounds and sinuses, and early introduction of specula, proctoscopes, fingers, or bougies.

31. Cauterizing fresh wounds, which induces bleeding directly incident to straining or subsequently through sloughing of tissue.
32. Allowing the patient to use the toilet instead of the bedpan shortly following operation.
33. Stretching the sphincter or rectum before rectal wounds have healed.
34. Careless, hasty withdrawal of packing.
35. Having patients strain down so that rectal wounds may be examined or treated.

SYMPTOMS

Anal bleeding, or fresh blood in evacuations, are unmistakable signs of rectal hemorrhage. *Slight* hemorrhages make the patient nervous, but do not induce other symptoms except where they recur frequently, month after month, when they cause anemia, slight loss of weight, and indigestion.

Profuse hemorrhages are invariably accompanied by alarming manifestations, unless immediately arrested.

External is quickly recognized, but *internal, invisible* bleeding is usually not diagnosed until the patient is in a dangerous condition; when considerable blood has been lost, and bleeding is *visible*, examination would demonstrate that the bandage, dressings, and sheet, if not the bed, are saturated with bright red blood.

Where hemorrhage is concealed the *patient complains of an incessant desire to stool, colicky pains, and marked abdominal distention* caused by the rapid accumulation of blood-clots and gas in the colon and sigmoid flexure, symptoms which continue until blood has been evacuated. In such cases evacuations, which consist of foul-smelling gas, fresh and clotted blood afford but temporary relief unless bleeding has been arrested, because the rectum quickly refills and symptoms recur.

A constant desire to urinate, with inability to empty the bowel, are other important manifestations of profuse rectal bleeding.

In cases of alarming anorectal hemorrhages the patient is anxious, restless, breaks out in a cold perspiration, complains of air-hunger, has dilated pupils, takes on a death-like pallor, his pulse-rate rapidly increases as the beat loses force and becomes almost if not imperceptible.

At this stage the patient usually faints, which tends to arrest bleeding, but when it does not, collapse and death may ensue from complete exsanguination.

In concluding the symptomatology the author wishes again to emphasize that an *incessant desire to stool, colicky pains*, and marked

lower abdominal distention are the *cardinal signs* of idiopathic and postoperative concealed rectal hemorrhage.

DIAGNOSIS

The diagnosis of anorectal hemorrhage is easy in the majority of instances because blood is seen in the stools or dribbling through the anus.

In exceptional instances where bleeding is concealed it may not be discovered until considerable blood has been lost, unless it is evacuated, or a colon tube or proctoscope has been introduced into the bowel.

Occult blood is a sign of gastro-intestinal lesion, but is of slight or no diagnostic value in anorectal affections, because lesions of every description in this region can be immediately detected with the finger and proctoscope.

Fresh or bright red blood indicates present or recent bleeding from the *lower rectum*, while blood-clots point to hemorrhage that occurred hours or days ago.

Brownish or coffee-grounds-like clots usually complicate lesions of the stomach, small intestine, or colon; black, fluid or semi-solid blood, those of the lower colon or sigmoid flexure, where bleeding has taken place a few hours before.

The diagnostic signs of alarming *idiopathic* and *postoperative* rectal hemorrhage, named in order of their importance, are: (a) *constant desire to empty the bowel*; (b) *distention of the lower abdomen*; (c) *diffuse colicky pains*; (d) *restlessness and general appearance* of the patient; (e) *fast thready pulse*; (f) *rapidly lessened blood-pressure*; (g) *death-like pallor*; (h) *syncope*, and (i) *shock*.

Occasionally hemorrhage is readily demonstrable in cases where it is difficult to diagnose the lesion causing it; but by studying the characteristics of bleeding as it occurs in the many anorectal affections discussed in the etiology, and making a systematic digital and proctoscopic examination of the rectum and anus, the affection responsible for loss of blood can be accurately determined.

One can easily locate blood in the rectum, but unless it is seen coming from a definite place it is difficult to determine whether it comes from a rectal or colonic lesion unless the bowel is examined through the sigmoidoscope and blood is seen as smears upon the mucosa of the upper rectum, or observed trickling from the sigmoid flexure into the lower bowel.

TREATMENT

When the result of disease, bleeding may be confined to the rectum, be associated with hemorrhage from lesions in the colon or possibly small intestine, and the involved segment of gut must be considered when planning treatment.

Idiopathic, operative, and postoperative rectal hemorrhage is controlled very much easier than bleeding from the small or large intestine, because lesions responsible for it can be seen and treated directly.

The treatment of *gastric, small intestinal, and colonic* hemorrhage, associated with rectal bleeding, briefly stated, consists in: (a) Keeping the patient in bed; (b) withholding solid food; (c) prescribing morphin, gr. $\frac{1}{4}$ (0.016), as indicated to relieve pain and quiet peristalsis and nerves; (d) administering an occasional laxative to insure soft stools; (e) prescribing calcium chlorid, gr. xv (1.0), four times daily in conjunction with a 10 per cent. gelatin solution, ʒ viij (500 c.c.); (f) bismuth, gr. xv (1.0), every four hours, and (g) serum in some form in required dosage.

Styptics have been found unreliable; heart stimulants, saline hypodermoclysis, and infusion are seldom employed because they increase blood-pressure, which, in turn, may dislodge occluding clots, although occasionally a chance has to be taken with infusion to save life.

Hemorrhage resulting from coloproctitis is usually controlled by irrigants introduced through the anus, *appendix (appendicostomy—Fig. 1019)*, or *cecum (cecostomy—Fig. 999)*. The author has found solutions of boric acid 4 per cent., ichthyol 2 to 5 per cent., balsam of Peru 4 per cent., and potassium permanganate $\frac{1}{2}$ per cent. very effective in this class of cases, where, as the result of extensive ulceration, diarrhea is annoying and bleeding alarming; daily flushing with one of the above irrigants is preceded by a high enema of warm water containing silver nitrate, gr. xv (1.0), followed by a saline injection, when the patient complains of discomfort.

Lesions in the rectum and lower sigmoid flexure that bleed can often be made to heal more quickly by reinforcing irrigations with topical applications of ichthyol, silver nitrate, balsam of Peru 8 per cent., or argyrol 20 per cent., and when sluggish, by touching them up with a fulgurating high-frequency spark, electric or Paquetin cautery.

Formerly erosions and ulcers of the anal canal were similarly treated, but experience has demonstrated that more satisfactory

results are obtained from moistening gauze with one of the above solutions, introducing it through a proctoscope, and leaving it *in situ* for several hours. By this method lesions are drained and medication is kept constantly in contact with them.

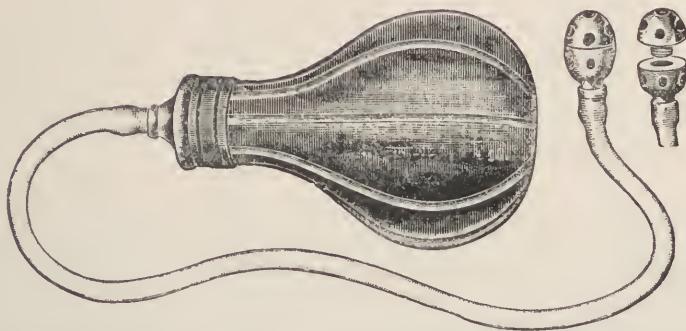


Fig. 363.—Gant's rectal evacuator for sucking out bloody water from the rectum following operation so that it may not be mistaken for postoperative hemorrhage.

To control active bleeding in this region gauze or cotton, after being dusted over or saturated with iron perchlorid, alum,

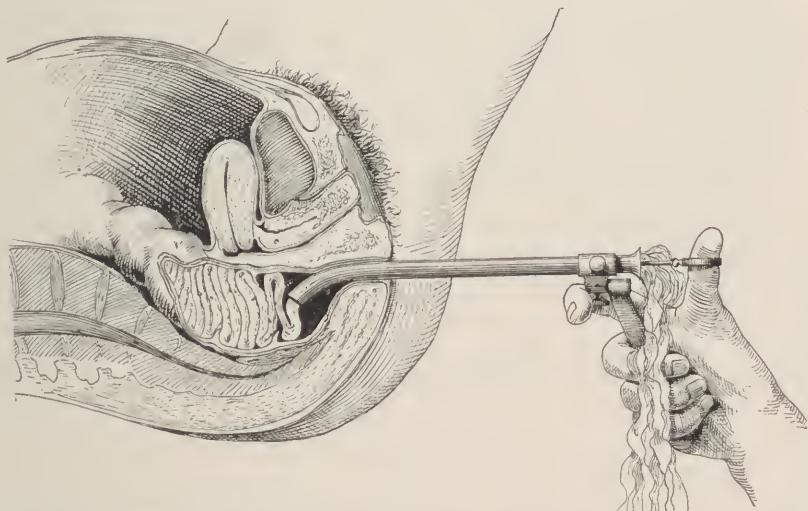


Fig. 364.—Method of arresting bleeding from ulcers and oozing areas by packing the rectum with stypticized gauze strips introduced through the author's modification of Darmac's gauze carrier.

tannic acid, adrenalin, or a solution of iron, is introduced in the same manner and left until bleeding ceases.

Styptics locally applied occasionally control oozing, but can-

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not be relied upon to arrest dangerous venous or arterial hemorrhage from spurting arteries or veins.

The plans above outlined are effective where bleeding is slight, but more certain methods are indicated when it is necessary to immediately control hemorrhage rapidly killing the patient.

Surgeons are frequently called to arrest bleeding by frightened nurses when there is none—*e. g.*, *bloody water* has been left in the rectum or the remains of a colonic enema drain out and soil dressings; if in such cases dressings are removed to find where blood comes from, a real hemorrhage may ensue.

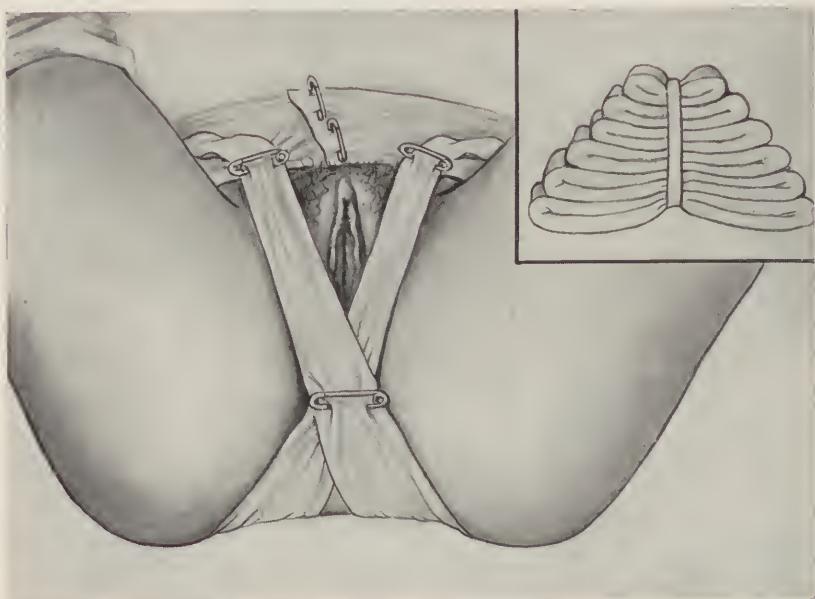


Fig. 365.—Author's pyramidal-shaped compress (insert) effective for preventing or arresting bleeding when retained over the anus by a tightly adjusted T-binder, legs of which are crossed and pinned over its center.

Such mistakes can be prevented by emptying the rectum with the author's evacuator (Fig. 363) at conclusion of the operation, and examining the gauze and cotton, which are soaked with bright red blood when the hemorrhage is *true*, and bloody water when bleeding is *false*.

Reliable Methods of Arresting Dangerous Idiopathic, Operative, and Postoperative Anorectal Hemorrhage.—Before attempting to control hemorrhage the rectum is first irrigated free from blood so that bleeding points may be located, and to prevent

accumulated blood in the sigmoid flexure or rectum from escaping after the bowel has been packed, which has led physicians and nurses to believe that bleeding has been renewed.

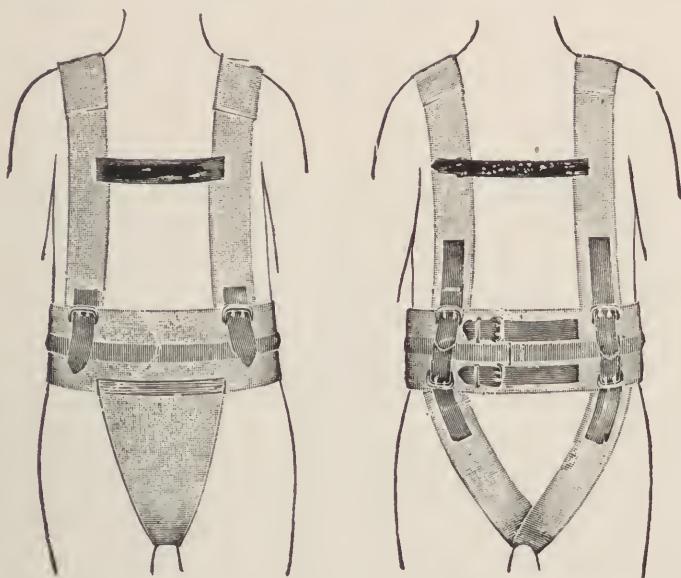


Fig. 366.—Showing back and front views of Gant's operating harness for holding dressing in place and making firm pressure over the anus after rectal operation to prevent bleeding. Pressure falls on the shoulders.

Many plans have been devised for controlling profuse anorectal bleeding, of which the following are the most dependable:



Fig. 367.—Author's gauze packer, employed independently or through the proctoscope when the lower sigmoid or rectum is distended with gauze or styptic cotton to control hemorrhage.

1. Placing a Gant pyramidal compress over the anus.
2. Ligation of bleeding vessels.

3. Packing the wound, anal canal, or rectum.
4. Suturing bleeding areas.
5. Clamping tissues or vessels with pressure forceps.
6. Distending the rectum with a rubber or cloth inflatable bag.
7. Cauterization of raw surfaces.
8. Introducing a drainage-tube wrapped with styptic gauze.
9. Torsion of veins and arteries.
10. Miscellaneous methods.

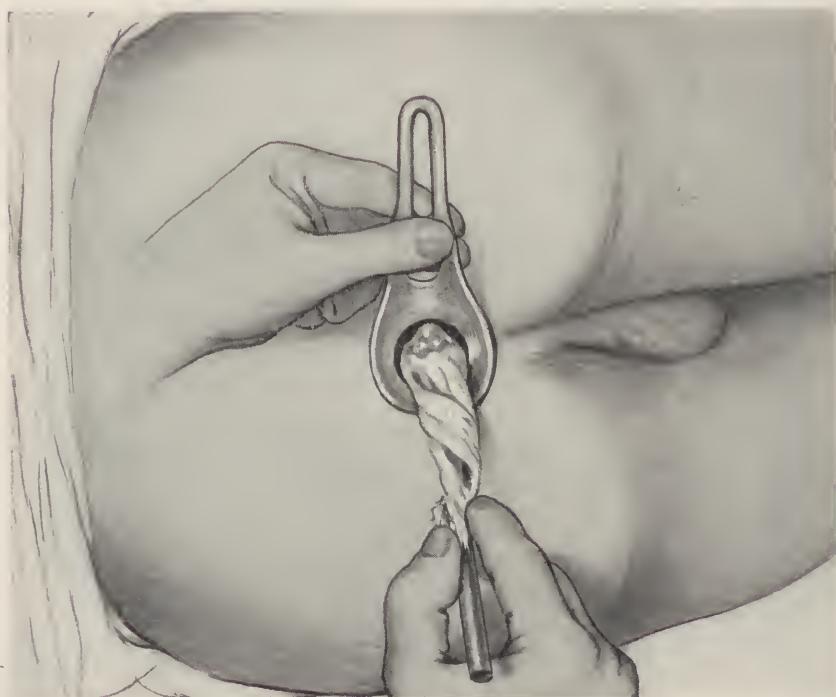


Fig. 368.—Simple method of introducing a gauze pack through proctoscope with aid of the author's metal dressing rod to control hemorrhage from a slipping ligature, ulcers, hemorrhoidal, or other anorectal operation.

Placing a Gant Pyramidal Compress Over the Anus.—The loss of a slight or considerable amount of blood is often traceable to a mucocutaneous cut or protrusion of hemorrhoidal or other stumps or lesions during straining subsequent to etherization.

Hemorrhage from these sources is nearly always prevented or arrested by placing the author's pyramidal compress (Fig. 365) over the anus and firmly supporting it with a well-adjusted T-binder (Fig. 365) or the author's operating harness (Fig. 366). The compress controls bleeding by direct pressure upon external wounds,

and forestalling hemorrhage from wounds and erosion of the anal canal by supporting the rectum during straining.

Ligation of Bleeding Vessels.—Spurting vessels are easily ligated when low down, but difficult or impossible to tie when in the upper rectum.

No attempt is made to thus control bleeding from a vein or artery when the mucous membrane or deeper structures are diseased and fragile, because the ligature cuts out and aggravates bleeding.

In some instances where blood comes from large raw surfaces bleeding is quickly controlled by lifting the tissues with heavy

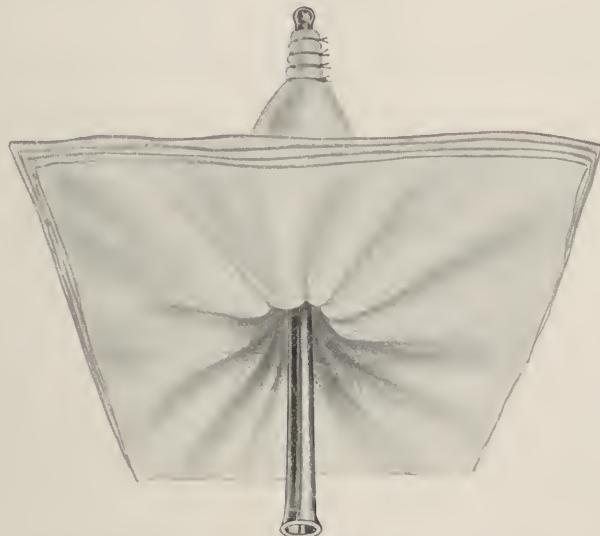


Fig. 369.—Method of arresting anorectal hemorrhage by introducing a Wales bougie around which is tied a thick gauze handkerchief. Following introduction of bougie the space between it and handkerchief is tightly distended with gauze strips. The procedure is completed by folding and retaining the external part of the gauze handkerchief about the anus and bougie with a snugly adjusted T-binder.

T-forceps and ligating them *en masse*, or encircling the bleeding area with a *purse-string* suture (Fig. 376, D and B).

In the majority of cases the author prefers packing to ligating, because it is more reliable and avoids traumatization of the tissues caused by forceps and ligatures.

Packing the Wound, Anal Canal, or Rectum.—Pressure can always be relied upon to control oozing and profuse bleeding from large or small veins and arteries when applied according to plans outlined below.

Copious bleeding from the anal canal is quickly stopped by

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introducing a compact stypticized gauze plug through the proctoscope (Fig. 368) and leaving it to project through the anus; this procedure is not effective when bleeding is from large spurting vessels.

When hemorrhage is from the lower rectum, as occurs in 80 per cent. of the cases, it is quickly arrested by *packing the anal canal* with gauze strips introduced *layer by layer*, until it is com-

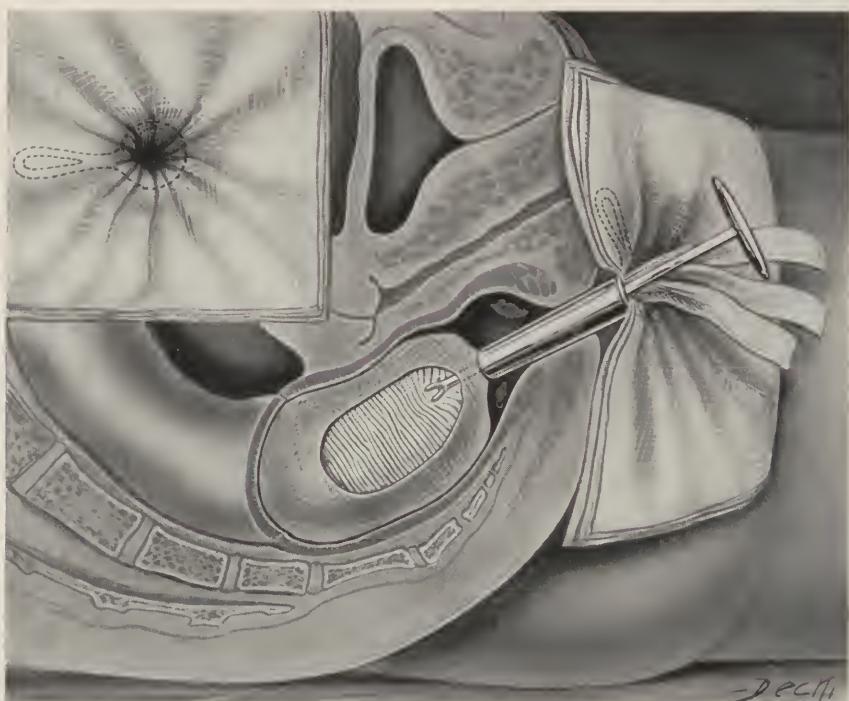


Fig. 370.—Author's technic of packing the rectum when a gauze handkerchief is introduced through a proctoscope. Gauze strips are inserted with author's packer (Fig. 367) until the rectum, anal canal, and ischial interspaces are filled. Insert shows appearance of gauze handkerchief introduced through the proctoscope.

pletely distended, ends of the gauze being left projecting through the anus, so that all packing may be removed at the same time.

Bleeding here is also controlled with the sponge, bougie, proctoscope and gauze, and inflatable bag methods described below. A very satisfactory plan for packing any segment of the rectum is to ligate a square gauze handkerchief around a bougie (Fig. 369), introduce it into the bowel, and pack the space about the bougie until the gut is distended and bleeding has been stopped. An advantage of this procedure is that gas and retained blood can

escape at all times. An equally good result is obtainable by pushing the gauze handkerchief through a proctoscope lightly distending it with gauze bandages, carried upward as far as necessary with the author's packer (Fig. 370). Where blood escapes from a number of points in the rectum or lower sigmoid flexure, the author has arrested bleeding by introducing a strong short or long sausage-shaped sack into the intestine and tightly packing it with gauze, following which its outer end is ligated after the plan shown in Fig. 371.

The surest method of controlling dangerous hemorrhage is to introduce a *sponge* through a proctoscope as high as required,



Fig. 371.—Showing appearance of the gauze-distended handkerchief or sack tied, which can neither move upward nor downward.

to which is attached two strong hemp strings (Fig. 372); the rectum and anal canal are then firmly packed with bandages by the layer method, after which a Gant pyramidal compress is placed over the anus and the ligatures are tightly tied across it. This procedure stops all bleeding because the lesion or wound is constantly in contact with the gauze, which is compressed between the sponge above and the pressure pad below (Fig. 373).

Suturing Bleeding Areas.—Bleeding from lesions, wounds, or injured vessels beneath the mucosa can sometimes be controlled by a running (Fig. 376, A) or purse-string suture (Fig. 376, B); but

the method is unreliable when the mucosa is fragile or tissues are diseased, because occasionally stitches tear through and augment bleeding, or the needle perforates a large vessel. Chromic catgut and the author's special round-pointed needle are employed for this purpose.

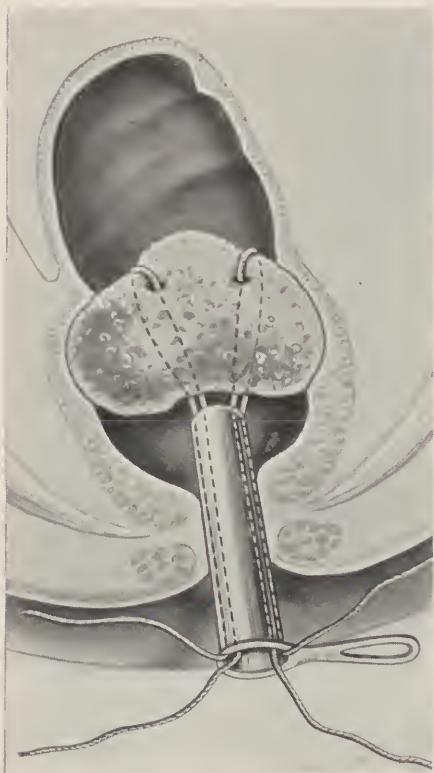


Fig. 372.—Author's sponge method of controlling idiopathic and postoperative hemorrhage. *First step:* A large sponge to which strong ligatures are attached is moistened, compressed, and introduced into the upper rectum through a large proctoscope.

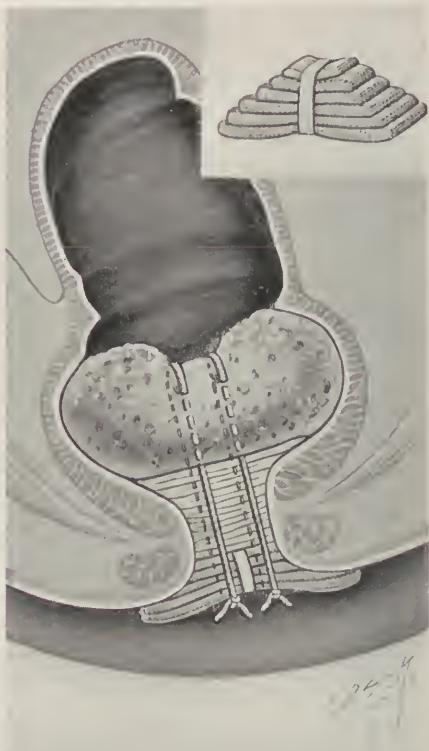


Fig. 373.—Author's sponge method of controlling anorectal hemorrhage. *Second step:* After the anal canal and lower rectum have been tightly packed with gauze strips arranged in layers the sponge is drawn downward and attached ligatures are tightly tied over the author's firm pyramidal gauze pad shown in the insert.

Clamping Tissues or Vessels with Pressure Forceps.—Alarming hemorrhage from large spurting vessels or extensive oozing areas in the anal canal or rectum is quickly controlled by clamping them with long pressure forceps when packing is impracticable. If the artery, vein, or mass of tissue can be ligated beneath the forceps, this is done; but when this is not feasible, the author's pressure

forceps (Fig. 374) are left *in situ*, after which the detachable handles are removed to avoid subsequent annoyance. The forceps are removed in two or three days by reinserting the handles, unlocking, and detaching the forceps.

Distending the Rectum with a Rubber or Cloth Inflatable Bag.—On several occasions the author succeeded in promptly arresting

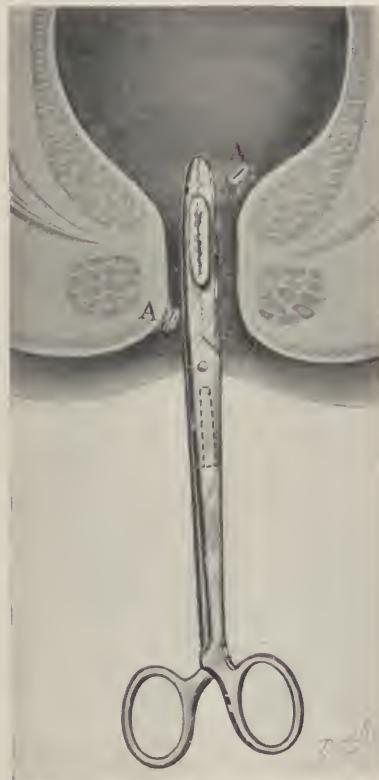


Fig. 374.—Arresting bleeding from a large area or vessel by clamping it with pressure forceps left *in situ* following removal of detachable handles: A, Vessels ligated.



Fig. 375.—Method of controlling hemorrhage in the lower rectum with a distended inflatable bag through which gas escapes.

copious hemorrhage by introducing his water-tight cloth stork material or rubber inflatable bag (Fig. 375) into the rectum through a large proctoscope, and distending it with air or water until it completely filled the bleeding segment of rectum or anal canal. Since the bag has a long rubber attachment, it can also be introduced into and made to control bleeding in the lower sigmoid flexure (Fig. 375). The author has also designed a long sausage-

shaped cloth bag with which he arrests hemorrhage by packing it with gauze, after the plan shown in Fig. 371.

Cauterization of Raw Surfaces.—Slight and copious hemorrhages from oozing wounds or lesions are in some instances controlled by eucainizing and cauterizing them with an electric or Paquelin cautery; but in others bleeding will continue despite repeated cauterization. This procedure is never employed to control hemorrhage from spurting vessels.

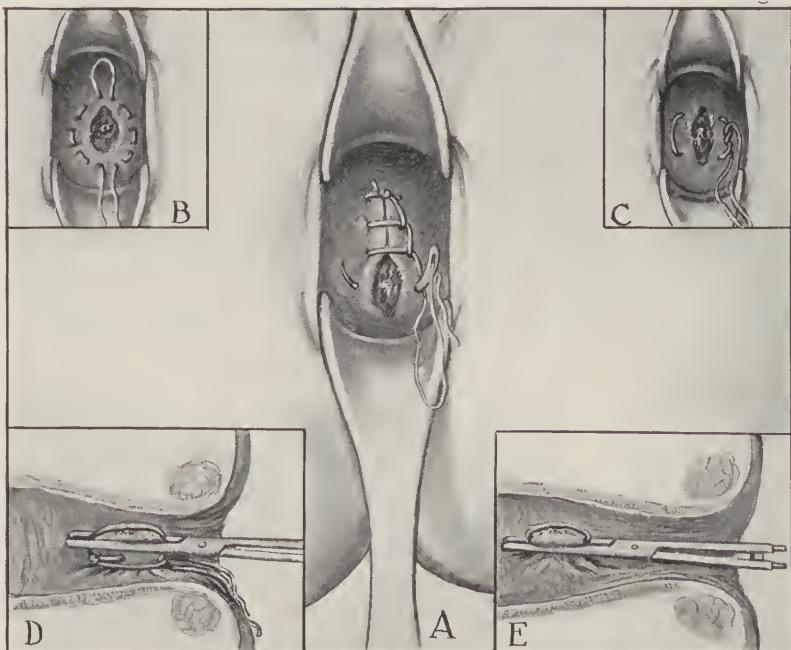


Fig. 376.—Different methods of arresting hemorrhage with needle, ligature, and pressure forceps having detachable handle: *A*, Tightly suturing wound or bleeding area, using a lock-stitch; *B*, purse-string suture surrounding vessel; *C*, artery included in a single stitch; *D*, bleeding structure clamped until the stump has been transfixed and ligated on either side; *E*, pressure forceps left *in situ* after the detachable handles have been removed (Fig. 374).

Introducing a Drainage-tube Wrapped in Stypticized Gauze.—Capillary hemorrhage may be stopped by introducing a large soft-rubber drainage-tube or bougie wrapped with styptic cotton, ordinary, or gauze containing iron, adrenalin, or other styptic.

Torsion of Veins and Arteries.—Some surgeons seize and twist vessels with forceps to prevent or arrest bleeding; a pernicious practice, frequently responsible for alarming hemorrhage, because pieces of mucous membrane or deeper structures are torn off by torsion, thus injuring other vessels.

Suturing (Fig. 376, A, B, C, D) or *clamping* (Fig. 376, E) the wound with pressure forceps having detachable handles is safe and more effective.

Miscellaneous Methods.—In cases of *hemorrhagic colitis*, disseminated rectal varicosities, and pin-point ulcerations, where bleeding takes place from many diminutive lesions scattered throughout the lower sigmoid and rectum, it is controlled and healing encouraged by filling the bowel with medicated or stypticized cotton or gauze packing, introduced with aid of the author's gauze carrier (Fig. 364) which is an enlarged modification of Darmack's.

Ice-bags over the abdomen and sacrum are often used in hospitals, but the author has never succeeded in diminishing or arresting copious bleeding with them.

Some surgeons place considerable reliance on elevating the foot of the bed, but neither this procedure nor adrenalin enemas minimize bleeding from spurting vessels.

In concluding his discussion of methods for controlling oozing and alarming hemorrhage the author wishes to say that he has found packing of the rectum and ligation of spurting vessels the most reliable procedures.

Treatment Following Hemorrhage.—Immediately hemorrhage is positively controlled the subject is placed in bed, surrounded by hot-water bottles, and given fluid nourishment in liberal amounts; when there is no danger of further bleeding digitalis or strychnin are administered, and a liberal quantity of decinormal salt solution may be injected into a vein or beneath the skin if needed; but these agents are contraindicated until bleeding vessels are permanently blocked, because they may dislodge partly or formed blood-clots by increasing blood-pressure.

Chapter XXXVII

Procidentia Ani, Recti, and Sigmoidæ

Definition.—Prolapse signifies the abnormal descent into the rectum or through the anus to a slight or considerable degree of one or more of the rectal or sigmoidal tunics.

Since the term *prolapsus* has for ages been used to designate falling of the rectum and sigmoid flexure, the author will continue

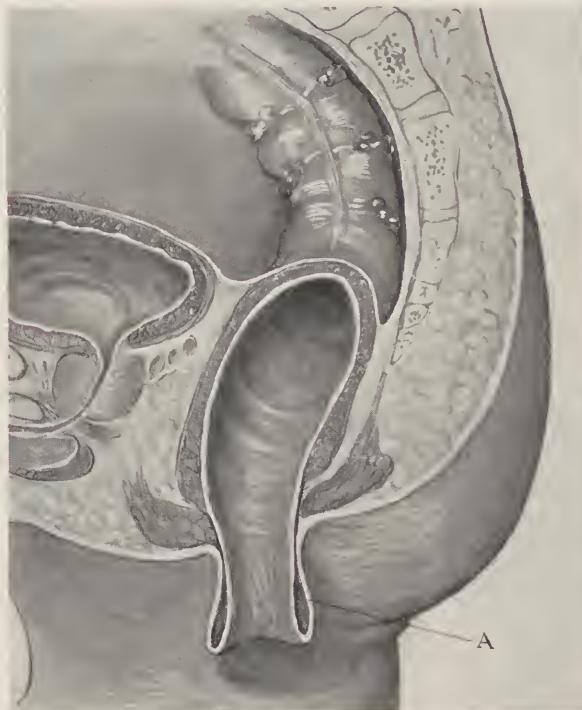


Fig. 377.—*Procidentia ani*: *A*, Prolapse of the mucous membrane.

to employ it, though from an etymologic viewpoint it does not correctly indicate the condition under all circumstances, more than does *procidentia* used by some authorities to indicate the *degree* or extent of the abnormality.

Ignorant physicians indiscriminately speak of, diagnose, and treat the diseases *procidentia recti*, *hemorrhoids*, and *polypi* as pro-

lapse of the bowel, which is incorrect, since the affections in nowise resemble each other, except they are characterized by *protrusion*. There is no reason for confusing the conditions, because in the *first* there is a descent of one or more rectal tunics, including the entire circumference of the gut (Fig. 378); in the *second*, dropping down of small or large tumors (piles) on different sides of the bowel separated by intervening strips of normal mucosa (Fig. 309), and in the *third place* a pedunculated growth (polyp) (Fig. 517) projects through the anus, around the base of which the finger is easily passed.

Frequently the author receives a letter stating a case of prolapsus of the rectum is being referred to him, and when more definite information is lacking he does not know whether he is to operate for piles, polypi, or prolapse. This puts him at a disadvantage, because the physician frequently makes inquiries as to



Fig. 378.—*Procidentia ani* in a girl two years old.

whether general anesthesia is necessary, time the patient must remain in the hospital, nature of the operation, probable expense of the treatment, questions impossible to answer before examination of the sufferer; because hemorrhoids, polypi, and prolapse of the first degree can be corrected under local anesthesia in five or ten minutes with but two or three days' detention, while a major operation and several days or weeks confinement in the hospital is necessary for the cure of aggravated complete procidentia recti.

Protrusion of the mucosa alone is designated *partial*, and descent of all the rectal coats is termed *complete prolapse*.

There are three *degrees* or types of prolapsus—*procidentia ani*, *procidentia recti*, and *procidentia sigmoidæ*.

Procidentia ani (Figs. 377, 378) is characterized by a prolapsed mucosa (Fig. 378), *procidentia recti* (Figs. 379, 380), by protrusion

of the mucosa and muscular tunics (Fig. 383), and *procidentia sigmoidæ* (Figs. 382-384), partial or complete prolapse of all the rectal coats *plus* invagination of the sigmoid flexure into the rectum.

This classification is better than that of authorities who designate the extent to which all coats of the bowel descend as *first*, *second*, and *third* degree prolapse, because with the author's grading of degrees the operator knows, immediately the diagnosis is made, whether or not a simple, slightly difficult, or major operation is indicated to cure the deformity.

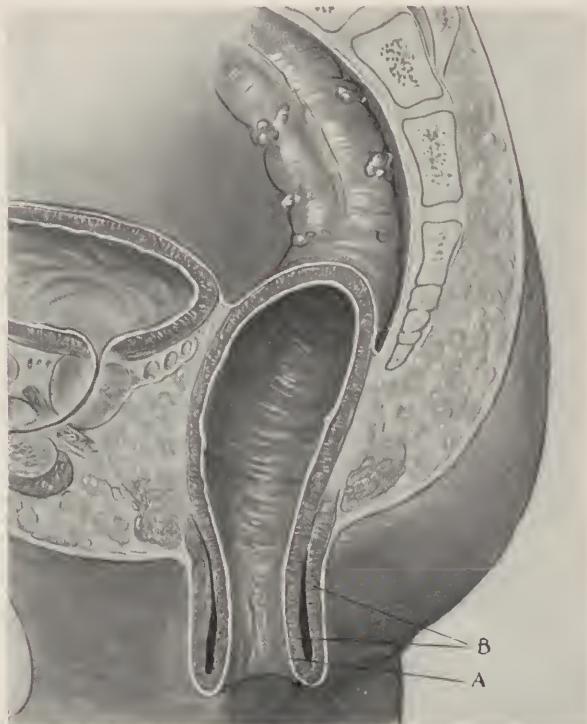


Fig. 379.—*Procidentia recti*: *A*, Prolapse of the mucous membrane, and *B*, muscular tunic.

Procidentia recti (Fig. 380) is observed most frequently in infancy and childhood, but may occur during active periods of life and very old age. Extensive prolapse encountered in persons whose ages vary from twenty to seventy years is usually a recurrence or continuation of prolapse that began early in life.

This affection, except when a complication of chronic diarrhea, stricture, cancer, or uterine procidentia (Fig. 384), is seldom acquired in individuals over thirty years of age. Protruding masses observed

in cases of procidentia ani, recti, and sigmoidæ vary in size (Fig. 383), length, color, and consistence, but ordinarily the tumor is soft and pliable, has a velvet-like touch, is pyriform in shape, marked by creases in the mucous membrane that cross each other



Fig. 380.—Extensive procidentia recti in a boy eight years old.

at irregular angles, and has a small circular, wrinkled distal extremity, with a slit in the center (Fig. 380).

ETIOLOGY

Procidentia of childhood is usually brought on by diarrhea, constipation, whooping-cough, phimosis, intestinal worms—lumbrioid and thread—or any condition that causes frequent evacuations, straining, or rectal tenesmus. The unusual length of the intestine, with its deficient ligaments, undeveloped muscular tunics, and diminished sacral curve, all favor falling of the bowel in early life.

Procidentia of adults frequently occurs in persons who suffered from the condition when young, but has been caused by vesical calculus (Fig. 686), foreign bodies, cystitis, prostatic enlargement, constipation with fecal impaction, enteroliths, helminths, hypertrophy of the anal papillæ or rectal valves, hypertrophied external sphincter or levator ani muscle, uterine displacements and prolapse, stricture or tumor of the bowel, bladder, or vaginal wall, that obstructs the gut or causes *persistent straining*. Strictures, cancers, and polyps are frequently responsible for the trouble, because they lead to the pushing or pulling one side or the entire rectum downward during defecation.

Chronic ulcerative colitis—catarrhal, tubercular, syphilitic, gonorrhreal, entamebic, bacillary, or flagellate—responsible for incessant diarrhea is a frequent and potent factor in prolapse owing to the accompanying relaxation of tissues, loss of peri-intestinal fat, frequent stools, and prolonged straining incident to the many evacuations and irritating discharge.

In several referred cases prolapse of the mucous membrane or of all the rectal coats followed operations for hemorrhoids, abscess, fissure, fistula, stricture, cancer or polyps, where the sphincter muscle had been partially or completely incapacitated (Fig. 381), the end of the lower rectum had been detached from the skin, or support to pelvic organs had been destroyed through removal of the coccyx and part of the sacrum in Kraske's operation (Fig. 385).



Fig. 381.—Procidentia recti resulting from leutic ulceration and destruction of the sphincters.

In dozens of cases first degree or procidentia ani was observed as a sequel of Whitehead's operation, and in many instances complete prolapsus was secondary to perineal or sacral proctectomy—rectal extirpation.

Among miscellaneous causes may be mentioned old age, tuberculosis, diabetes, anemia, locomotor ataxia, gastro-intestinal disturbances, chronic rheumatism, typhoid fever, enteroptosis, vomiting, gas distention, abdominal tumors, uterine procidentia, pregnancy, paralysis, injuries to the spine or sacral plexus, constipation and auto-intoxication, and any disease or condition that leads to the absorption of fat or relaxation of the tissues, impairs centers or nerves presiding over the intestinal musculature, increased peristalsis, induces displacement of colonic segments or straining, breaks or stretches intestinal ligaments or that leads to sagging of pelvic peritoneum and weakens or paralyses the sphincter or rectal muscles.

The upright posture assumed by man plays an important part in the production of this condition, particularly where the sphincter muscle is weak, the patient has a stricture, or suffers from uterine procidentia.

Procidentia recti has been induced by accumulated exudates between the bowel tunics and dissection of the mucosa from the muscular coat by abscess. Prolonged and frequent visits to the toilet are conducive to prolapse on account of straining incident

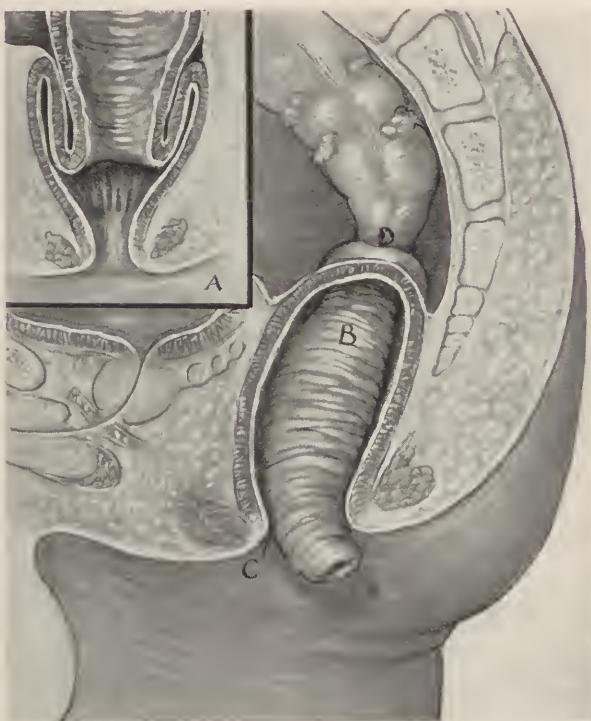


Fig. 382.—*Procidentia sigmoidæ*: A, Partial; B, complete; C, sigmoid extruded through the anus; D, point of invagination.

to defecation where an individual constantly feels as if the bowel has not been emptied. Procidentia has followed extensive anorectal ulceration (Fig. 381). Whitehead's operation for destruction or removal of the sphincter and formation of a sacral anus in rectal extirpation.

SYMPTOPATHOLOGY

From the patient's viewpoint the chief manifestation of prolapse is protrusion of the bowel during stool, and at other times

in aggravated cases where the sphincter is weakened or paralyzed. When the condition is incipient the bowel usually returns spontaneously, or when the patient draws himself upward; but in long-standing cases observed in elderly patients several inches of the rectum or sigmoid suddenly extrudes while walking, working, or exercising, and in extreme instances constantly remains outside to dangle between the legs.

In all *degrees* of prolapse sooner or later proctitis occurs, which causes an abnormal secretion of mucus that at intervals or continuously escapes through the dilated sphincter to excoriate and inflame the perianal skin, scrotum, buttocks, or legs. The author has treated many patients for procidentia recti who were incapacitated from attending to their social and business duties owing to this soreness, or to the protruded gut (Fig. 384).



Fig. 383.—Extensive procidentia recti et sigmoidæ.

tated from attending to their social and business duties owing to this soreness, or to the protruded gut (Fig. 384).

In cases of procidentia ani, recti, and sigmoidæ the length of gut projecting outside the anus varies from 1 inch (2.54 cm.), first degree (Fig. 378), to 15 inches (38.10 cm.), in third degree prolapse (Fig. 383), and in many of the author's cases the extruded gut was from 3 to 8 inches (7.62–20.32 cm.) in length, and in some instances reached the floor when the patient assumed a squatting posture (Fig. 384).

Sometimes in neglected cases of extensive prolapse involving all rectal coats the bowel is sensitive, excoriated, or lacerated, the result of trauma caused by up-and-down sliding of the bowel, or to injury of the mucosa induced by the patient in his efforts to return and keep the mass above the sphincter (Fig. 384, F).

Under such circumstances unless procidentia is corrected and excoriated areas are promptly healed, mixed infection of diminutive and larger lesions in the mucosa may take place, resulting in the formation of undermining ulcers varying in size that excite an irritating discharge even if they do not cause hemorrhages or diarrhea. In such untreated cases submucous abscesses and fistulæ form, the bowel tunics become hypertrophied and indurated, which makes more difficult return of the prolapsed bowel and the retention of it above the anus.

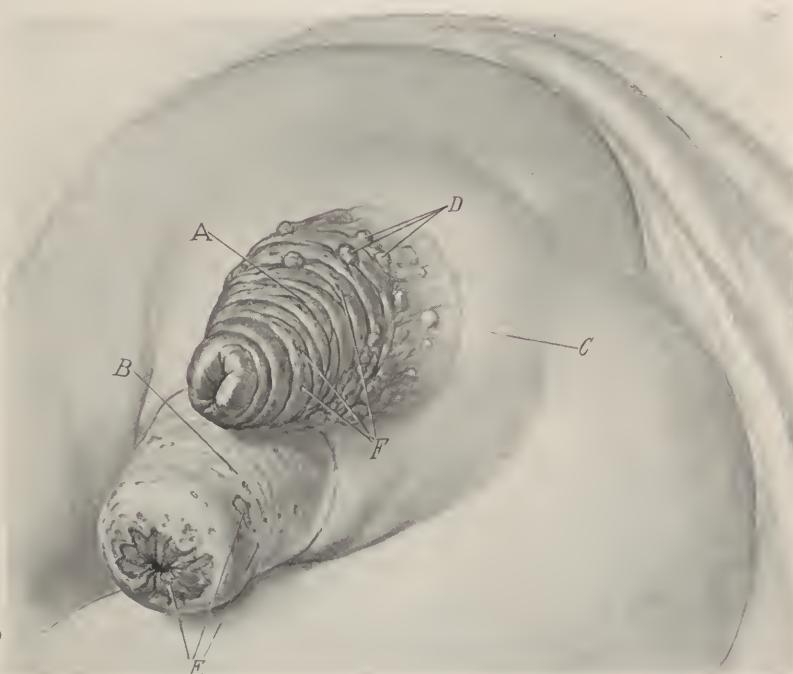


Fig. 384.—Complete procidentia recti et uteri: *A*, Procidentia recti; *B*, procidentia uteri; *C*, bulging of surrounding structures induced by prolapsing organs; *D*, papillomata of rectal mucosa; *E*, excoriations of cervix and uterus; *F*, rectal ulcers.

Not infrequently when the *rectum* and *mucosa* of the extruded gut are constantly bathed in an acrid or mucopurulent discharge, hypertrophic changes occur, resulting in the formation of numerous pyramidal and ovoid-shaped papillomata or polyps, varying from pea to pullet-egg size that project or hang from the protruded bowel like grapes (Fig. 384, *D*).

Recently the author treated an extensive complex case of third degree procidentia where the mass was several inches in length and had a diameter the size of a child's head, the mucous

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covering of which was thickly dotted over with hundreds of soft, glairy looking fragile papillomata, varying in size from a grain of



Fig. 385.—Extensive procidentia sigmoidæ through overlarge sacral anus that occurred following superior proctectomy (Kraske's operation). The patient could wriggle the prolapsed gut like a dog wags its tail.

wheat to that of an English walnut whose bases blended. A prompt cure followed operation, which consisted in ligating large and



Fig. 386.—Procidentia of the colon and sigmoid through upper and lower openings that followed colostomy performed for inoperable non-malignant tumors complicated by dense adhesions.

fulgurating small growths, after which the sigmoid was drawn upward and anchored to the anterior abdominal wall by linen suspensory sutures tied across rubber tubing.

In deplorable cases of procidentia recti the uterus may also prolapse (Fig. 384), the patient complains of pelvic or abdominal pains, chronic diarrhea or digestive disturbances incident to pulling upon the mesenteric nerves by the invaginated or extruded gut, and partial or complete incontinence caused by divulsion, paralysis, or laceration of the sphincter, which must daily give way as the bowel extrudes and recedes.

Sometimes in commencing procidentia before the sphincter is incapacitated the extruded gut becomes strangulated by the anal muscle and rapidly increases in size, assumes a bluish and then a blackish hue, and may *slough* off unless it is reduced or the muscle divulsed or divided to release it.

Varicose internal hemorrhoids frequently complicate procidentia (Fig. 411), which is natural, since the anal mucosa is being constantly stretched, traumatized, and kept in a state of congestion, and blood in the hemorrhoidal plexus is prevented from returning to the portal system because of pressure upon small and large veins.

Deaths have been reported from procidentia incident to rupture of the prolapsed gut during straining, and following spontaneous amputation of the extruded intestine induced by sphincteric strangulation.

DIAGNOSIS

There is no reason for mistaking procidentia ani, recti, or sigmoidæ for any other condition, yet it is done almost daily. Prolapsus at first manifests itself in a cone-shaped, mucus-covered, wrinkled, soft swelling, composed of one or more bowel tunics and characterized by a slit in the distal extremity, the latter being smaller than the anal segment of the tumor (Fig. 380).

The protruding mass, small at first, gradually increases in size until it may measure from 1 inch (2.54 cm.) to several inches in length and from $1\frac{1}{2}$ to 4 inches (3.81–10.16 cm.) in width. In the beginning the bowel descends during defecation, after which it retracts, but in neglected cases the sphincter muscle loses its power and the gut escapes at any time.

Tumors of this type are pinkish in color, slippery, and soft, in contradistinction to malignant growths, which are invariably hard, lobulated, firmly attached, and do not protrude.

Procidentia recti is commonly confused with hemorrhoids and polyps, but these tumors resemble the first condition in no way except that they protrude.

Prolapsed gut is distinguished by its attachment around the

entire circumference of the bowel, *cone shape*, irregular creases in the mucous membrane and *transverse slit in its apex* (Fig. 383).

Hemorrhoids are recognized by their segmental attachment about the anal canal, broad base, olive shape, with strips of mucosa separating them (Fig. 312).

Polyps are characterized by a narrow pedunculated attachment, irregular shape, fragile or firm, bell-clapper-like lower extremity, and are readily diagnosed by passing the finger around them while in the rectum or extruding from the anus.

Finally, other distinguishing features between these protrusions are: *prolapse* is generally a disease of childhood, *hemor-*

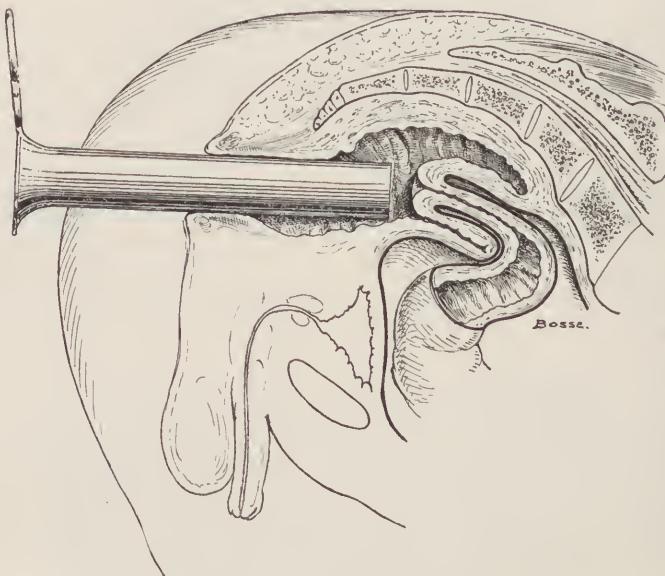


Fig. 387.—Technic of diagnosing high procidentia recti and invagination of the sigmoid flexure through the proctoscope.

rhoids of middle life, and *polyps* of any age when the bowel is inflamed or ulcerated and causes a hypersecretion of mucus or discharge that constantly irritates the mucous membrane.

In procidentia the anus is patulous and the patient is sometimes afflicted with partial or complete incontinence, the result of daily stretching the sphincter by the extruded gut, while hemorrhoids and polyps are frequently complicated by sphincteralgia and sphincterismus caused by the muscle's attempt to free the anal canal of them.

Slight bleeding is a complication of procidentia when the

bowel through trauma is excoriated; hemorrhage is profuse in typical cases of varicose internal hemorrhoids; the escape of blood seldom is a complication of polyps, except when detached by hardened feces, under which circumstance slight or profuse bleeding may ensue.

Pain and discomfort incident to prolapse is felt in the abdomen or lower rectum as sensations of fulness and pressure; suffering caused by hemorrhoids is confined to the lower anal canal, and results from spasmotic contractions of the sphincter and levator ani muscles, and where piles and polyps are strangulated and cannot be replaced.

Occasionally the speculum and proctoscope are helpful in diagnosing hemorrhoids, papillomata, and fibrous polyps, but instrumentation (Fig. 387) for diagnostic purposes is seldom required in cases of procidentia recti.

Where *invagination* complicates or causes prolapse, the telescoped gut can be felt in the rectum during intervals of defecation with the finger, and in such cases the finger can be passed in the sulcus lying between upright rectal tunics and invaginated bowel.

Occasionally loops of *small intestine* descend with the sigmoid (hernia recti), and when they do, the condition is recognized by gurgling sounds, impulse on coughing, and bulging of the anterior surface of the bowel.

PROGNOSIS

Spontaneous cure of procidentia recti never occurs except in the young, where it is overcome by growth of the child or elimination of the cause behind it.

A cure invariably follows properly treated *prolapsus ani*; recurrences are rare following operations for *procidentia recti*, but several failures have been reported following the surgical treatment of third degree or *procidentia sigmoidæ*.

In recent years, or since his adoption of radical procedures below recommended for the various types of prolapse, the author has seldom been called upon to perform a second operation to relieve recurring procidentia, nor has a single death occurred as the result of surgical treatment.

The *excision* operation is still performed by many surgeons, though it frequently terminates fatally, due to opening and infecting the peritoneal cavity, and recurrence following the procedure is frequent.

TREATMENT

The treatment of procidentia recti is *palliative, non-operative, and surgical*, depending upon duration and extent of the condition, and whether or not the patient will submit to operation.

Before inaugurating a plan of treatment designed to temporarily or permanently relieve prolapse, local and constitutional affections that cause or aggravate the condition, as hemorrhoids, growths, stricture, phimosis, constipation, lung affections, uterine procidentia, anemia, locomotor ataxia, etc., must be treated, otherwise recurrence may take place sooner or later.



Fig. 388.—Procidentia recti of moderate degree, lateral view. Cured without operation. (See Fig. 389).

Palliative and Non-operative Treatment.—Palliative measures are justifiably employed when the patient declines surgical intervention, or while he is being prepared for operation, and to give temporary relief until curative measures are instituted.

Palliative treatment consists chiefly in *procuring regular soft evacuations* that abolish straining, *irrigating the rectum* with warm astringent solutions, promptly *replacing the protruded bowel* after defecation, and *applying hot fomentations* over the anus to relieve spasm when the gut is caught by an irritable sphincter.

Non-operative Treatment.—Several times operations have been avoided and the patient cured through the aid of non-operative measures about to be discussed, but such results have been obtained in cases of *procidentia ani* (Fig. 378), slight in degree and of short duration, occurring in infants and young children.

When prolapse is extensive or involves two or more rectal tunics, an operation is imperative and time is not wasted with *palliative* and *non-operative* measures, because they accomplish nothing and the condition gradually becomes worse.

Occasionally the author has succeeded in permanently curing procidentia ani—prolapse of the mucous membrane—affecting infants and children under five years of age by: (a) prescribing a daily laxative or enema to prevent constipated stools and straining; (b) circumcising the child if troubled with phimosis; (c) administering soothing medicines to allay coughing and antidiarrheal remedies to diminish frequency and fluidity of the evacuations; (d)

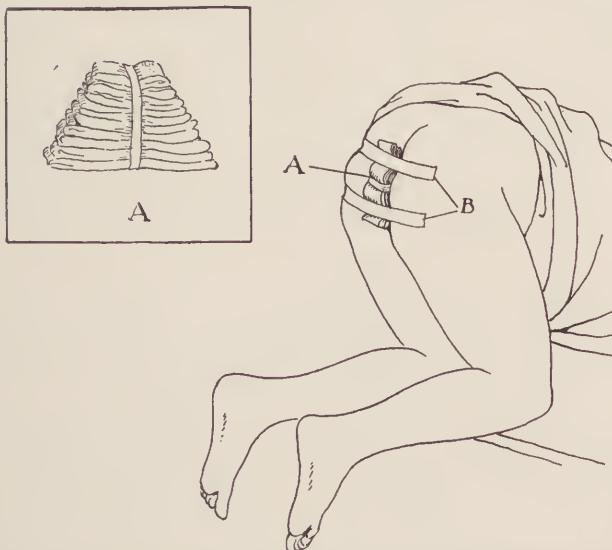


Fig. 389.—Author's method of preventing and curing procidentia ani by supporting the anus with *A*, pyramidal compress, and *B*, firmly strapping the buttocks over it.

irrigating the rectum morning and night with a cold infusion of quassia, black oak bark, or solution of ichthylol, balsam of Peru, or alum solution, 20 grains to the pint, to tone and pucker up the mucosa; (e) replacing the bowel after stool; (f) having the patient defecate in the recumbent posture or on the side, with hips elevated, to diminish pressure upon the lower rectum, and (g) constantly keeping a pyramidal-shaped compress over the anus (Fig. 389, *A*), held in place by a T-binder or strong adhesive straps (Fig. 389, *B*), that pull the buttocks over it, thus preventing the child from straining down, and which stimulates sphincteric contraction and strengthens the anal outlet.

This treatment must be carried out for weeks or months in different cases to completely correct the prolapse, during which time the child is kept quiet and from crying.

Reduction of the Protruded Bowel.—When the extruded mass fails to return spontaneously or has not been replaced the physician must immediately restore the gut to its normal position, which is easy when the bowel is not swollen, and difficult when the tumor mass is edematous.

In exceptional cases general anesthesia or infiltration of the sphincter with eucain, and stretching or dividing the muscle, is required to release the strangulated bowel. With one or two exceptions the author has never failed to reduce prolapse in the following manner: with the patient in the knee-chest posture, extruded gut is cleansed with warm boric acid, and covered with soft linen, or silk smeared with oil or vaselin, then the tumor is grasped in the hollow of the hand and squeezed free of serum by even pressure made on all sides, after which the protrusion is gradually replaced by beginning at its distal extremity and working the extruded gut upward and through the sphincter with fingers separately manipulated.

Rectal plugs designed to retain the bowel above the sphincter in intervals of defecation are at times serviceable; some are self-retaining and others are supported by straps. Pessaries sometimes stimulate anorectal muscles to vigorous contraction and hypertrophy, so they hold the bowel up.

Injection Treatment.—In a few instances the author has cured moderate degrees of prolapse after the plan employed for injecting internal hemorrhoids (see Chapter XXXII) by injecting a solution of carbolic acid, glycerin, and olive oil—equal parts preferably, or quinin and urea (10 per cent.) into as many areas of the mucosa as required. These agents cause an inflammation characterized by hard lumps or ridges which later are followed by contraction and shortening of the mucous membrane; now and then sloughing occurs, but this is unimportant, since contracting scars form as ulcerated areas heal.

Surgical Treatment.—When non-operative treatment fails it is satisfying to know that slight, moderate, and deplorable cases of procidentia recti and sigmoidæ are curable by operation.

Many operations theoretically perfect prove failures when submitted to a practical test because, however perfect the *technic*, the operation does not achieve the desired result unless it accomplishes one or all of the following aims:

1. Creates an inflammation resulting in adhesions that prevent the rectal tunics from gliding over each other (Fig. 391).
2. Gets rid of redundant tissue and narrows the bowel caliber (Fig. 402).
3. Tightens the anal canal and flabby structures about the anus (Fig. 400, B).
4. Shortens the sphincter or causes hypertrophy of the anal muscle through stimulation (Fig. 393).
5. Anchors the sigmoid or upper rectum so that it cannot prolapse into the ampulla or anal canal (Fig. 400, D).
6. Provides for easy expulsion of the feces by doing away with straining.

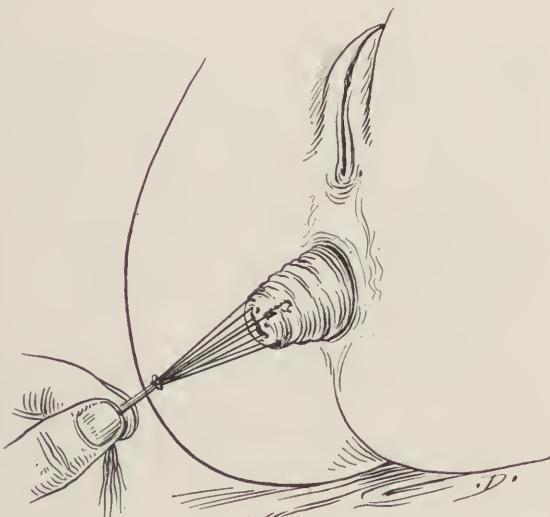


Fig. 390.—Author's traction sutures employed for withdrawing and steadyng the gut in his procidentia operations.

Below the author has briefly described the technic employed by him when correcting different grades of prolapse. Some of these operations are original, while others include new features in combination with suggestions made by other operators.

Procidentia Ani—First Degree Prolapse.—Prolapse of the first degree is easily cured because there is but one coat involved—the mucous membrane (Fig. 380).

Linear cauterization is the operation of choice in this class of cases and is carried out under local or general anesthesia in the following manner:

First Step.—After the mucous membrane has been exposed and put on the stretch with an operating speculum or ligature

tractors (Fig. 390) it is cauterized by deep linear burns paralleling the long axis of the gut placed $\frac{1}{2}$ inch (12.7 mm.) apart until the mucosa of the entire circumference of the bowel has been treated in like manner (Fig. 391).

Second Step.—Perianal skin and sphincter muscle are cauterized at four equidistant points about the anus by pressing the cautery point into the tissues for $\frac{1}{2}$ inch (12.7 mm.).

Third Step.—A wide strip of vaselin-covered gauze is introduced to prevent burned areas from coming in contact and to minimize discomfort.

Fourth Step.—A knobbed- or pyramidal-shaped, supporting gauze plug (Fig. 389, A) is placed over the anus, held in place by a



Fig. 391.—Appearance of the lower rectum following thorough linear cauterization.

snugly adjusted T-binder. The Percy or Paquelin cautery may be used, but the former, which is run by an electric current, is more reliable than the latter, heated by benzin.

Some surgeons draw the cautery lightly over the mucosa, but this accomplishes nothing, for unless the cautery is carried almost, or through the mucosa, very little inflammation and no scar tissue follows the procedure. Care must be exercised when cauterizing the mucosa in children since the musculature is not fully developed, the peritoneum lies within 1 inch (2.54 cm.) of the rectum, and when penetrated peritonitis may ensue.

Linear cauterization is effective when well done, but when carelessly performed recurrence surely follows.

Clamp Operations.—Several times the author has perma-

nently relieved procidentia ani with little inconvenience to the patient by cutting off a liberal strip of the mucosa two or more inches in length after it had been caught up with forceps and compressed between jaws of the author's pile clamp as in hemorrhoidal operations (Fig. 350).

In some cases hemorrhage is arrested and wound edges approximated by a continuous lock stitch—iodized catgut suture—introduced external to the clamp, or a running stitch passed around the instrument and tightened as clamp blades were withdrawn,



Fig. 392.—Author's local anesthesia ligature operation for procidentia recti and ani: *A*, Ligatures applied to infiltrated areas of mucosa which are then used as tractors; *B*, stump left following excision of mucous membrane; *C*, method of anesthetizing the bowel; *D*, anesthetized mucosa seized with T-forceps and made ready for ligation and excision.

or by thorough cauterization of the wound or stump, as in hemorrhoidal operations.

When there is excessive sagging of the mucous membrane two or more strips of the mucosa are in turn removed after the manner suggested.

Author's Local Anesthesia Ligature Operation.—This procedure (Fig. 392) is simple, performed under eucain or sterile water anesthesia, and requires less than ten minutes.

First Step.—The mucosa is infiltrated with eucain at three or four points, beginning near the distal extremity of the prolapsed gut.

Second Step.—The raised, glassy white wheals (Fig. 392, C) are in turn caught with T-forceps, lifted upward and ligated with strong linen, the threads being temporarily left long to act as tractors (Fig. 392, A).

Third Step.—The prolapsed gut is then drawn downward and held steady with the traction sutures, while the mucous membrane higher up is injected, pulled outward, and ligated at as many points as may be required.

Fourth Step.—Masses external to the ligatures are excised, care being taken not to leave the stump too short, otherwise the thread may slip and hemorrhage ensue.

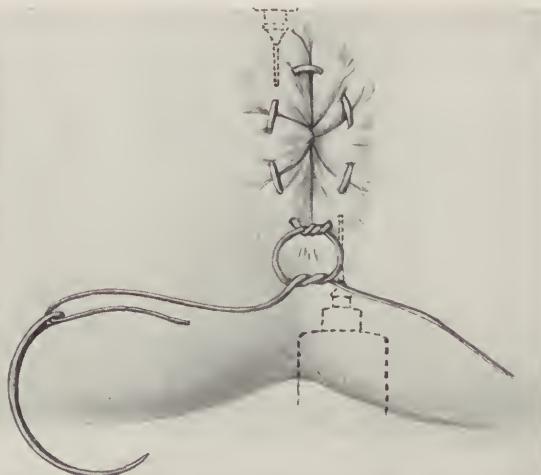


Fig. 393.—Simple local anesthesia procedure for curing slight proctidinia ani by surrounding the anus with a catgut purse-string suture which tightens the anus by inciting sphincteric spasms and hypertrophy of the levator ani muscle, and causing the formation of exudates that agglutinate the mucous and muscular coats.

Fifth Step.—The extruded bowel is lubricated and carefully worked upward through the sphincter, after which the anus is covered with a gauze pad reinforced by a bandage.

This procedure is usually effective, because large ulcers form as a result of the sloughing, which lead to *glueing* together of the mucous and muscular coats, and formation of *cicatrices* that contract, taking the slack out of the mucous membrane.

The operation has been performed many times in the office and clinic under water or eucain anesthesia, without confining the patient to bed more than two or three days, if at all, and in no case has a serious accident or annoying sequel followed the procedure.

Purse-string Suture.—Introduction of a purse-string suture in

and about the sphincter, after the plan shown in the accompanying illustration (Fig. 393), usually mitigates and sometimes cures proc-

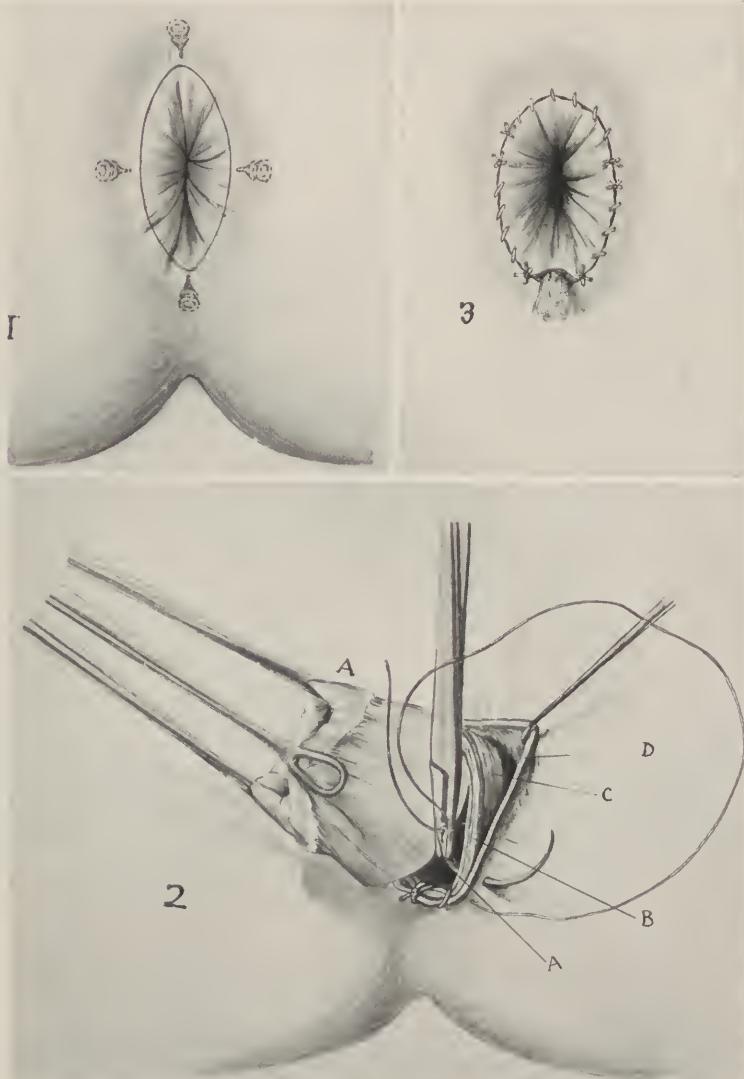


Fig. 394.—Excision of mucous membrane under local anesthesia for aggravated procidentia ani: 1, Line of incision at the mucocutaneous juncture; 2, mucosa; A, freed, withdrawn, and partially excised; B, muscular coat; C, sphincter; D, skin; 3, mucous membrane sutured to the perianal skin and drain inserted.

identia ani. The stitch irritates the sphincters, levator ani and adjacent anorectal muscles, and causes them to frequently contract

and become hypertrophied to such an extent that they tighten the anus and lower rectum and prevent extrusion of the mucosa.

The author employs ten-day iodized catgut or kangaroo tendon. Linen and silk have been used by others, but are objectionable, since subsequent removal of the non-absorbable sutures is necessary.

Removal of a Circular Strip of Mucous Membrane.—*Prolapsus ani* can be cured by making an incision around the anus at Hilton's white line, freeing and amputating 2 or 3 inches (5.08 or 7.62 cm.) (Fig. 394, 1, 2, 3) of the mucous membrane, and completing the



Fig. 395.—Author's posterior proctoplasty. *First step:* Through a semicircular incision midway between coccyx and anus the rectum is freed, brought outside, and incised longitudinally; A, lateral traction sutures introduced.

operation by suturing the mucosa to the integument. This, like Whitehead's operation, is objectionable because stricture and other sequelæ follow it when primary union is not obtained.

Procedentia Recti—Second Degree.—In this condition the several coats comprising a part or all of the rectum extrude through the anus (Fig. 380), which makes it more difficult to cure than the above, where mucosa only protrudes.

Often in this class of cases *linear cauterization*, the *purse-string suture*, *clamp and cautery*, or *ligature operation* may be advantageously employed in connection with the procedures below described.

Author's Posterior Proctoplasty—Proctorrhaphy.—First Step.

With the patient aseptically prepared and in the Sims posture a transverse 2-inch (5.08 cm.) semicircular incision (Fig. 397) is made at a point midway between the coccyx and anus, following which the rectum is freed from its lateral and posterior attachments by blunt dissections.

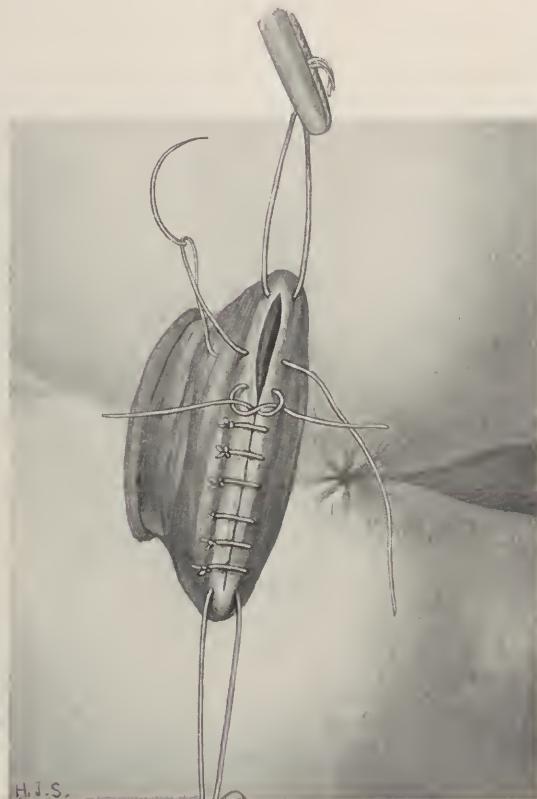


Fig. 396.—Author's posterior proctoplasty. *Second step:* The rectum is shortened by suturing the longitudinal incision transversely.

Second Step.—The lower rectum is pushed backward through the cut with the first and second fingers of the right hand and then drawn outward as far as possible with sponge forceps.

Third Step.—Through-and-through traction sutures are introduced in the center of the extruded mass, following which it is split from end to end by a longitudinal incision (Fig. 395).

Fourth Step.—Traction sutures are drawn upon until the longitudinal becomes a transverse incision, which is then closed

with iodized catgut sutures, materially shortening the rectum as shown in Fig. 396.

Fifth Step.—Traction sutures are threaded upon a long strong needle, having a handle, and carried upward posterior to the rectum, where they are made to emerge through all the tissues at the sacral borders.

Sixth Step.—The extruded bowel is returned through the cut, which is closed with interrupted iodized catgut sutures, except at one point, through which a cigarette drain is inserted (Fig. 397).



Fig. 397.—Author's posterior proctoplasty. *Third step:* The wound is closed and a drain inserted, traction sutures are left long and brought out on either side, and tied across gauze pad placed over the sacrum (see Fig. 399), which lifts the rectum upward and retains it in the sacral hollow.

Seventh Step.—The operation is completed by tying the suspension stitches at the sides of the sacrum across a gauze pad or rubber tubing in order to prevent pain and cutting of the skin (Fig. 399).

This procedure has proved satisfactory in several cases independently or when reinforced by linear cauterization or the ligature operation to shorten and narrow the rectal wall *anteriorly*.

Author's Anteroposterior Proctoplasty—Proctorrhaphy or Infolding Operation.—Good results may be expected from this procedure alone. It has the advantage over many operations in that it provides plenty of room in which to work, and enables one to partially or completely obliterate Douglas' pouch.

First Step.—Following sterilization and putting the posterior vaginal wall upon the stretch with retractors it is split from top to bottom by a median line incision.

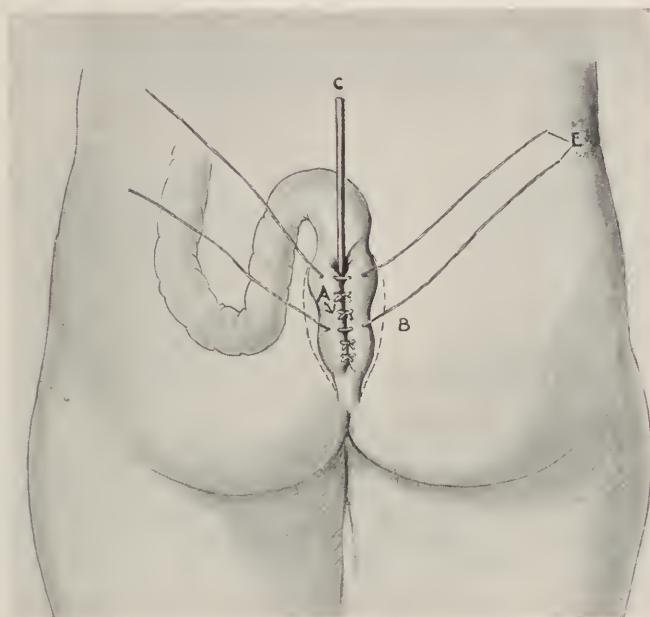


Fig. 398.—Author's anteroposterior infolding sacrovaginal operation for procidentia recti. The bowel, *B*, is exposed, freed, and narrowed by infolding catgut sutures, *A*, with aid of a rod *C*. Final inversion sutures, *E*, are left long after being tied, to be used in the next step of the operation

Second Step.—With sharp and blunt dissections the vaginal mucous membrane is loosened and the rectum freed all around from the sphincter to its serosal attachment, peritoneum in front and at the sides of the bowel is freed of small intestine, ligated, and excised, which partially or completely obliterates Douglas' pouch.

Third Step.—Using iodized gut or linen interrupted sutures the rectum is plicated longitudinally or transversely in front and at the sides.

Fourth Step.—The wound is closed by deep and superficial catgut and wire sutures and the vagina is dressed with aristol gauze.

Fifth Step.—The rectum is then exposed through a posterior median line incision at the sacrococcygeal border (Fig. 398).

Sixth Step.—The posterior rectal wall is then deeply plicated with interrupted hardened catgut sutures at one or more points (Fig. 398).

Seventh Step.—Plicating sutures employed to infold the lateral rectal walls are carried through soft parts and skin at the sacral borders with a special long handled needle, where they are tied across rubber tubings, or preferably a gauze pad (Fig. 399, *B*) to prevent their cutting the skin.

Eighth Step.—The posterior wound is closed with iodized, plain, deep, and superficial catgut sutures, reinforced by three strong linen retention stitches.

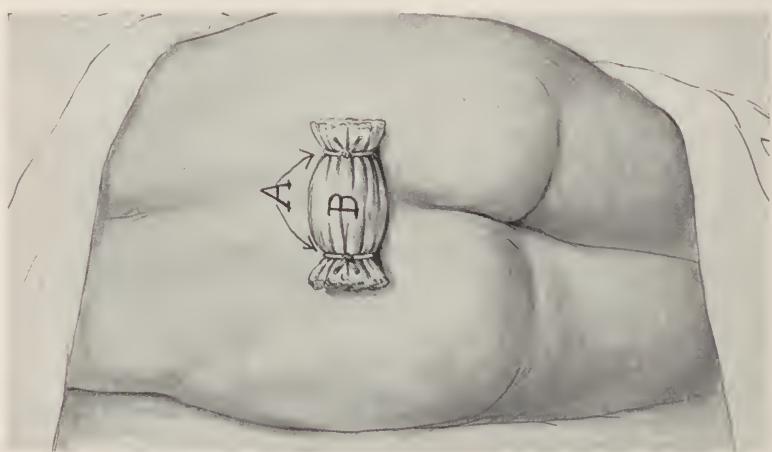


Fig. 399.—Author's anteroposterior proctoplasty infolding sacrovaginal operation: *A*, Suspensory sutures tightly tied over *B*, a gauze pad, which lifts the rectum upward and holds it in the sacral hollow.

Ninth Step.—When there is invagination of the sigmoid into the rectum the operation is completed by sigmoidopexy (Fig. 400, *D*).

Advantages of Sacrovaginal Proctorrhaphy.—With it one accomplishes the following objects:

1. Infolding and plication of the rectum on all sides.
2. Obliteration of the distorted peritoneum about the bowel and in Douglas' pouch without entering the peritoneal cavity.
3. Anchoring of the plicated rectum in the sacral hollow by suspension suture (proctoplasty).
4. Attachment of the sigmoid to the anterior or posterior abdominal wall which prevents it from reinvaginating.

Author's Wire Operation.—*First Step.*—Through a posterior

median or lateral incision extending from the third sacral vertebra to the anus the coccyx is excised and the rectum is freed from its attachments.

Second Step.—A fine silver wire mattress, $\frac{1}{2}$ inch (12.7 mm.) in width and 18 inches (45.7 cm.) in length, is wound spiral fashion about the bowel from below upward and anchored by several binding wires, which when adjusted press the mattress inward, causing indentations that give the bowel a slight corrugated appearance.

Third Step.—After the insertion of a gauze drain at its lower angle the wound is closed with interrupted gut sutures.

Longitudinal wire splints have been successfully substituted for the above spiral mattress.

Complications other than stitch abscess have not been encountered, and flattering results have followed the operation owing to stiffening and holding up of the bowel caused by the wire mattress becoming encysted and strong adhesions resulting from the irritation and inflammation caused by a foreign substance in the tissues. Silver wire is well tolerated, as it manufactures its own antiseptic, an albuminate of silver, which keeps infection from occurring.

The author has not found it necessary to reinforce this procedure in any way.

Procidentia Sigmoidæ.—Deplorable *third-degree procidentia*, characterized by invagination of the sigmoid into the rectum (Figs. 382, 383), extrusion of all lower bowel coats through the anus, stringing out of the sphincter, and relaxation of the perianal structures, is an exceedingly difficult condition to cure permanently.

Most of the author's cases of procidentia sigmoidæ had previously been operated on from one to half a dozen times, recurrence having followed the operation within a few days, weeks, or months.

Many operations have been previously designed to correct this type of prolapse, but none has given satisfaction because the many objects sought cannot be accomplished by any *single* procedure; realizing this, the author several years ago worked out the following technic, which includes *three distinct operations* performed one after the other, requires three-quarters of an hour, and has proved effective in nearly all cases.

Author's Combined Operation.—*First Step.*—With sponge, forceps, or traction sutures (Fig. 400) the extruded gut is put on the stretch, and its upper extremity is *cauterized* entirely around by linear burns passing through the mucosa and penetrating the muscular coat (Fig. 400, A), following which the protruding gut is returned to the rectum.

Second Step.—A diamond-shaped piece of tissue 3 inches (7.62 cm.) long, including all the rectal coats, and 1 inch (2.54 cm.) of

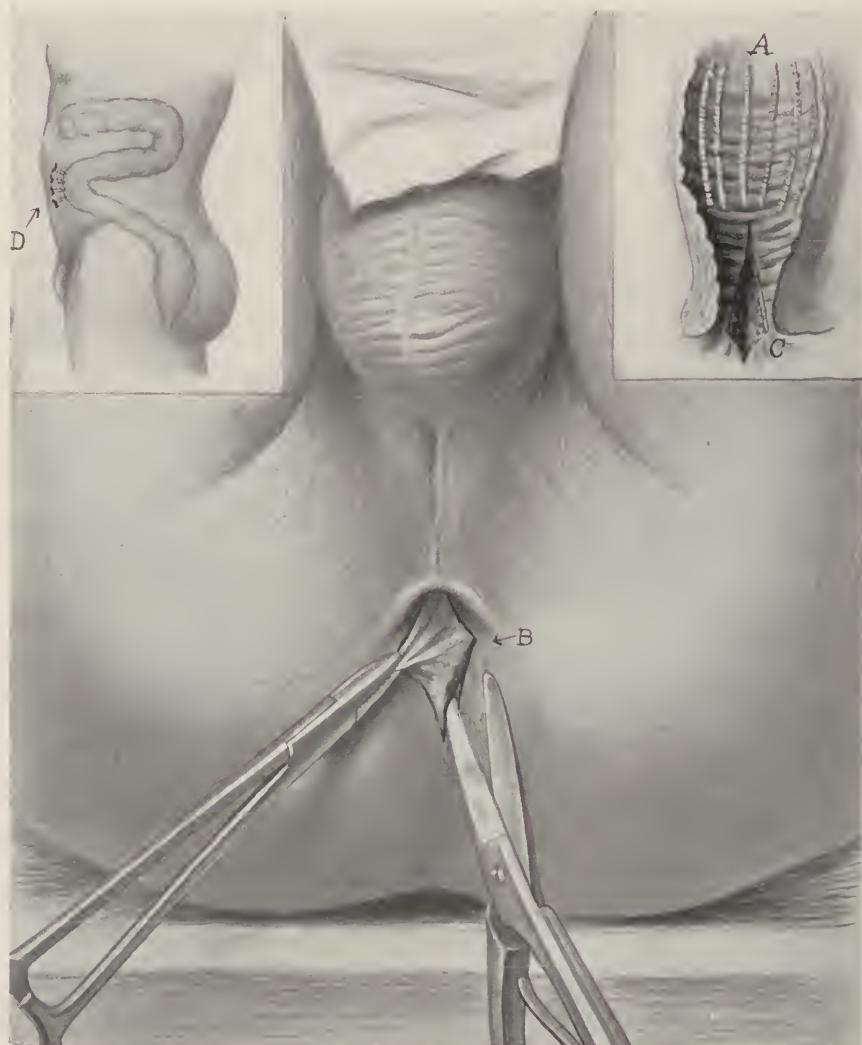


Fig. 400.—*Author's combined operation.* This procedure, which has never failed in deplorable procidentia recti et sigmoidæ, embraces several distinct operative procedures: *A*, Multiple linear cauterizations of the rectum; *B*, removal of a posterior 3-inch (7.62 cm.) diamond-shaped flap, which when the wound *C* is closed narrows the lower rectum, tightens the sphincter, and takes up slack in structures lying between the anus and coccyx. *D*, Sigmoidopexy—suspending the gut to the anterior parietes with linen suspension sutures tied across rubber tubing and plicating the pelvic peritoneum. (See Fig. 407.)

the external sphincter and postanal skin with deeper structures is removed with strong scissors (Fig. 400, *B*).

Third Step.—After placing a wick drain in the posterior angle wound edges are approximated by deep iodized and superficial or gut sutures.

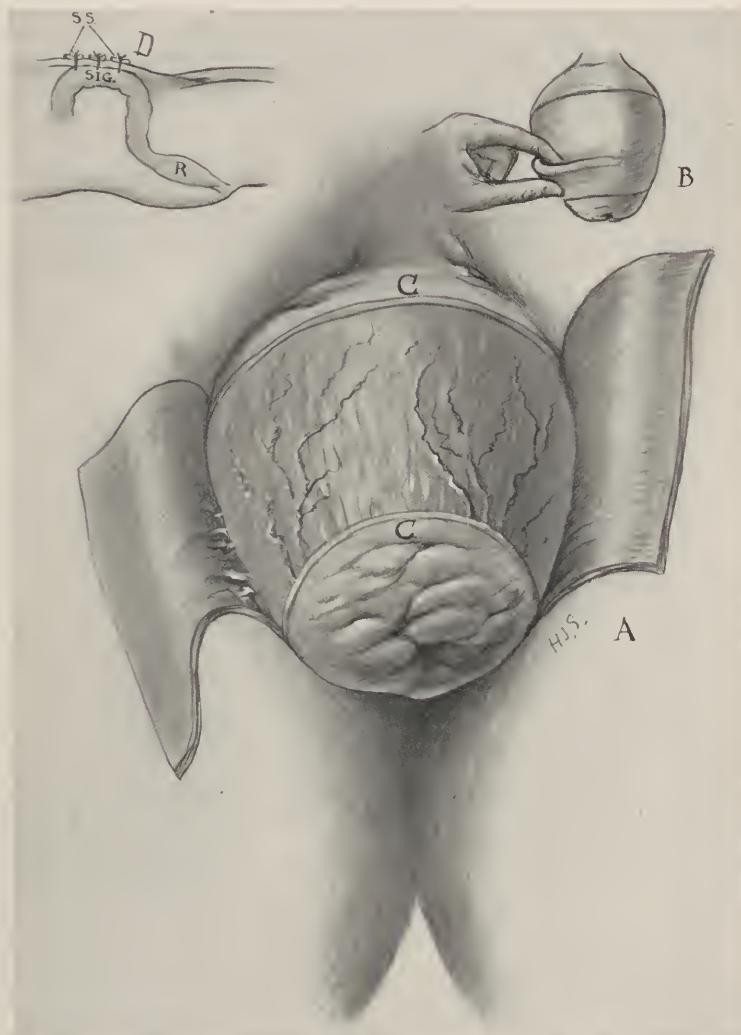


Fig. 401.—*Author's cuff plicating and sigmoidopexy operation for aggravated complete procidentia recti:* A, Wide cuff of mucous membrane removed; B, rectum shortened by plicating musculature with two or more rows of catgut sutures (see Fig. 402); C, proximal and distal edges of mucosa are approximated with catgut (Fig. 402, B); D, the sigmoid flexure drawn upward, made taut, and attached to the anterior abdominal wall—sigmoidopexy by S. S. three linen suspension stitches.

Fourth Step.—Through an incision at the outer border of the left rectus the sigmoid flexure is located, drawn upward until the

rectum is taut, and suspended to the musculature of the anterior abdominal wall—*sigmoidopexy* (Fig. 400, *D*), following the removal of a peritoneal strip. Linen sutures are tied across rubber tubing to prevent their cutting the skin (Fig. 400, *D*).

Fifth Step.—Slack is taken out of the sagging serosa surrounding the bowel by plicating the peritoneum in circular fashion above the gut (Fig. 407), using plain catgut sutures.

Sixth Step.—The incision is closed with a whip or intercutaneous catgut suture.

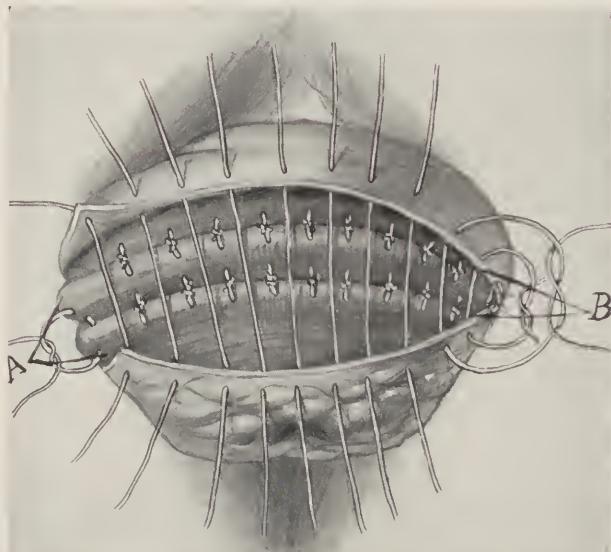


Fig. 402.—*Author's cuff and plicating operation with sigmoidopexy* effective in moderate cases of rectal prolapse and in conjunction with the author's combined operation (Fig. 400) performed in deplorable cases of procidentia recti et sigmoidæ: *A*, Folds of the muscular coat sutured following removal of a broad cuff of mucosa (see Fig. 401). *B*, Distal and proximal edges of mucosa being closed with interrupted catgut sutures.

Author's Combined, Cuff, Plicating, and Sigmoidopexy Operation.—For extensive cases of procidentia recti characterized by invagination of the sigmoid, extensive extrusion of the bowel, marked distortion of the parts, weakening of pelvic supports, and destruction of the sphincter muscle (Fig. 384) the following is preferable to the above operation owing to the large amount of slack taken out of the rectum:

First Step.—Having drawn the extruded gut outward as far as possible with sponge forceps or tractor sutures, incisions are made through the mucosa entirely around the extruded gut near its distal end and within $\frac{1}{2}$ inch (12.7 mm.) of the anus, after which

the mucosa is split by a longitudinal cut made in the median line upon the anterior surface of the bowel (Fig. 401, A).

Second Step.—The isolated cuff of mucous membrane is then detached from the muscular tunic by sharp-blunt dissections (Fig. 401, A), and bleeding is arrested by ligating spurting vessels and applying gauze wrung out of hot water to oozing surfaces.

Third Step.—The raw muscular coat is caught with fingers, folded over (Fig. 401, B), and sutured with interrupted iodized gut, making a pleat that extends around the gut (Fig. 402), following which similar plications are formed that take up in the muscular

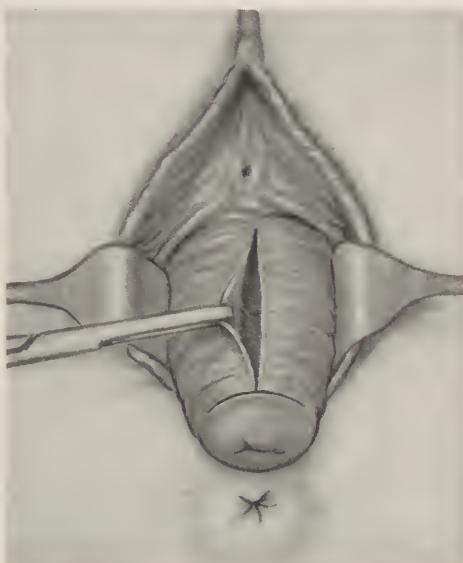


Fig. 403.—First steps of the *interposition operation* for procidentia uteri complicating procidentia recti (Fig. 384): Incisions and flaps to expose bladder, free it from anterior vaginal and anterior cervical walls; allows of uterine delivery through anterior vaginal cut after bladder has been pushed up into abdomen.

wall and slack until the distal and proximal edges of the mucosa come together (Fig. 402, B).

Fourth Step.—Cut edges of the mucosa are then joined (Fig. 402, B) with ten-day catgut, barring five equidistant openings left, through which cigarette drains are introduced.

Fifth Step.—The sigmoid is anchored to the abdominal wall by sigmoidopexy (Fig. 400, D).

Reduction of Peritoneal Slack.—In deplorable cases of third-degree procidentia sagging of pelvic peritoneum is marked. Under such circumstances the author when performing the above opera-

tions eliminates peritoneal sagging by circular plications and suturing serosa to the bowel (Fig. 407), pelvic fascia, or uterus, or ligating and excising it in sections.

Ventral fixation of the uterus or shortening of the round ligaments or interposition operation is practised in connection with the author's procidentia operations when the patient is afflicted with uterine prolapse (Fig. 384). In a few such cases entrance to the vagina has been diminished by a plastic operation (Figs. 403, 404).



Fig. 404.—Completed *interposition operation* for procidentia uteri complicating procidentia recti. Insert: Normal anatomic relations. Main picture: Postoperative relations showing uterus blocking pelvic outlet with bladder held up above uterus.

Colopexy and gastropexy are performed when splanchnoptosis is associated with procidentia recti or invagination of the sigmoid into the rectum.

Excision (Amputation).—Excision of a rectal segment is comparatively easy and not dangerous in procidentia ani and moderate cases of procidentia recti, but when all coats of the rectum or sigmoid flexure project several inches beyond the anus the operation is tedious and dangerous because of shock and frequency with which it is followed by peritonitis when the peritoneal cavity is opened or loop of small intestine has been injured.

Most surgeons give excision preference over other procedures.

Formerly the author frequently performed this operation for the relief of extensive rectal prolapse, but long since abandoned it because recurrence followed in nearly every instance, and the mortality was high, being about 10 per cent.

In deplorable cases of procidentia the mesentery is very long; suspensory ligaments of the bowel are stretched or broken, pelvic

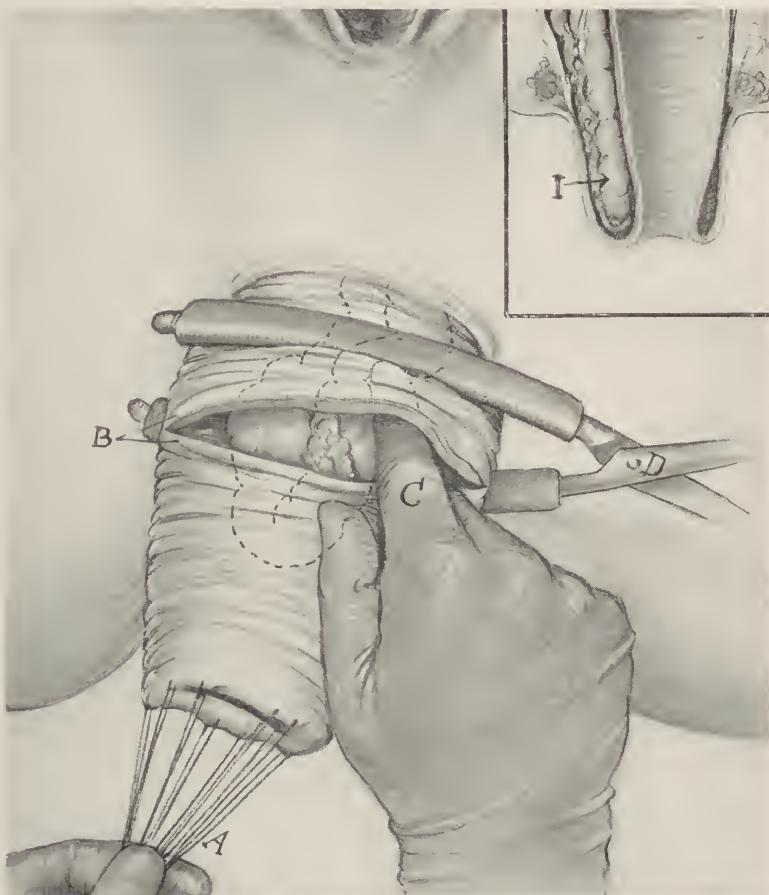


Fig. 405.—*Author's excision*—proctectomy for complete procidentia recti. Step one: Insert, I, shows loop of small intestine coming down with prolapsed gut; A, traction sutures; B, incision through bowel tunics; C, fingers pushing loop of small intestine upward into the pelvis; D, rubber-covered intestinal clamp ready for adjustment.

peritoneum is extremely relaxed, and under such circumstances, and when pelvic supports have been destroyed by rectal extirpation or hysterectomy, the bowel again tends to extrude shortly following excision, whether one or several inches of the gut have been removed.

Amputation of the extruded gut in extensive procidentia recti is a tedious procedure and fraught with danger owing to the frequency with which the peritoneal cavity is infected, small intestine incised, or the bladder injured, and for these reasons the operation is *contraindicated* except when the extruded mass is *strangulated*, is enormous, and cannot be returned.

When removing the lower extremity of the bowel the author replaces the prolapsed gut and extirpates it, as in *perineal excision*

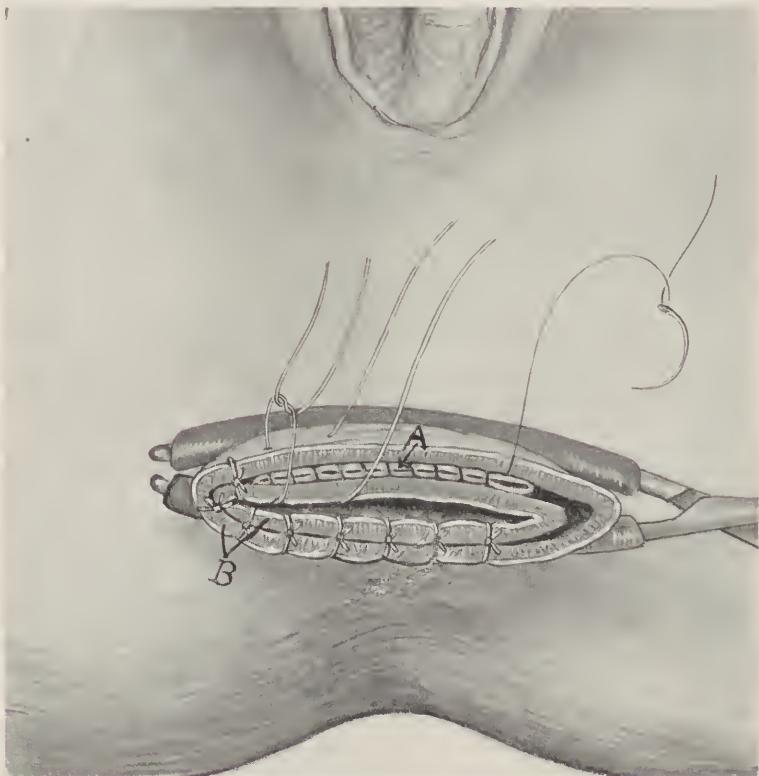


Fig. 406.—*Author's excision* for procidentia recti. Second step: Following clamping and excision of gut and closure of peritoneum anteriorly; *A*, distal and proximal ends of the bowel, *B*, are anastomosed with interrupted through-and-through sutures.

for rectal cancer, described and illustrated elsewhere, or after the plan shown in Figs. 405-407.

Following removal of the prolapsing gut and entero-anastomosis (Fig. 406) or suture of its proximal end to the anus he opens the abdomen, performs sigmoidopexy (Fig. 400, *D*) to prevent possible recurrence, and eliminates slack in the peritoneum by circular plication (Fig. 407).

Extruded gut has been removed with the *écraseur* (Gerhardt), *silk* (Weinlechter), and *elastic* ligature (Esmarch), hazardous procedures because the peritoneum and small gut are likely to be injured.

When extirpating the bowel a drain is inserted if the peritoneal cavity is opened, and care taken not to leave an opening through which loops of the small intestine may slip and become strangulated. When enteroptosis complicates procidentia recti, *gastropexy*, *colopexy*, and *nephropexy* one or all are performed in connection with the above procedures if indicated.

Miscellaneous Operations.—The following briefly described operations deserve consideration owing to their original character

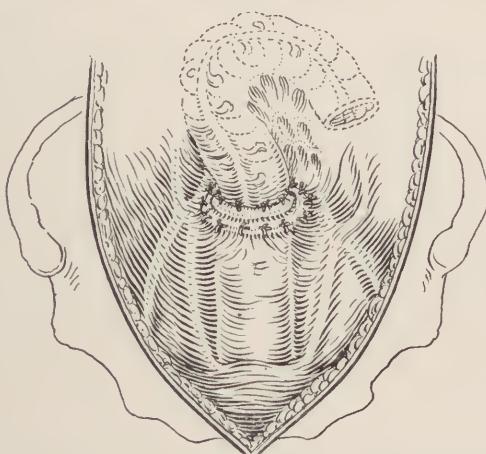


Fig. 407.—Author's method of reducing slack in pelvic peritoneum in operations for procidentia recti with invagination of the sigmoid flexure into the rectum.

and usefulness. Most of these procedures cannot be relied upon to cure obstinate extensive prolapse, but are of value when combined with other operations, as will be seen by comparing them with the author's previously described technic.

Duret removes anterior and posterior elliptic flaps of mucosa, plicates the exposed muscular wall, and closes wounds in the mucous membrane.

Delorme excises the mucous membrane about the extruded mass and sutures its proximal end to the skin, as in Whitehead's operation.

Dieffenbach and Roberts dissect out a 2-inch (5.08 cm.) posterior strip, including the bowel coats and sphincter, which narrows the lower rectum when wound edges are approximated.

Sick, through a posterior incision, frees the rectum, tampons it on all sides with gauze, and closes the wound with adhesive straps; the gauze, which is expected to produce the formation of adhesions, is removed in two weeks.

Gersuny twists the detached bowel upon itself before suturing it to the skin.

Matthews excises a broad cuff of mucous membrane and sutures the severed ends of the tunic.

Verneuil, Maylard, Fowler, and Tuttle, with slightly varying technic, treat procidentia recti by proctopexy, which is most easily and satisfactorily accomplished by exposing and pushing the rectum through a posterior longitudinal or semicircular incision made between the anus and coccygeal tip, then, with the aid of a long-handled needle, two rows of sutures taken in the muscular coat of the rectum are carried upward through the wound and brought out at the sides of the sacrum where they are tied across a gauze pad placed over the bone to prevent their cutting the skin (Fig. 399), posterior *proctopexy*.

Dupuytren removes an elliptic fold of integument and contiguous mucous membrane to reduce caliber of the rectal outlet.

H. W. Allingham suggested an elongated mesentery as the cause of procidentia recti, and performed sigmoidopexy to correct it.

McArthur takes up bowel slack by folding the sigmoid and joining legs of the loop by lateral anastomosis, after which he performs sigmoidopexy.

Moschowitz obliterates Douglas' pouch and peritoneal folds by introducing purse-string peritoncal sutures about the gut and stitching peritoneum to the pelvic fascia, uterus, and bowel serosa for support, care being taken to avoid the ureter.

The author combines this procedure (Fig. 407) with his sigmoidopexy in deplorable cases of procidentia sigmoidae (Fig. 383).

Postoperative Treatment.—Where stitches have been used in procidentia recti operations daily cleansing, drying, and protecting the wound with sterile gauze is necessary, otherwise the suture line becomes infected and breaks down.

Diminutive doses of oil, laxative medicines, mineral water, or preferably oil enemata are administered nightly to procure easy, soft evacuations; the patient is kept upon the back with hips raised during defecation; care is also taken to prevent coughing, to arrest diarrhea, and forestall straining from any cause.

Cauterized and granulating wounds are cleansed or swabbed, wiped dry, and painted with ichthylol, 20 per cent., where healing is delayed, after which gauze drains are placed in crevices if deep.

Following sigmoidopexy patients are kept in bed for two weeks that firm union between the bowel and abdominal wall may take place; results are better following the above-described operations when patients temporarily forego the toilet and have all movements while in the recumbent posture, because additional straining incident to the upright position favors recurrence of the prolapse.

Movements are prohibited for a week following the author's combined operation, rectal excision, and other extensive procedures employed in the treatment of procidentia recti.

Chapter XXXVIII

Anorectal Ulceration

SIMPLE, INFECTIOUS, SYSTEMIC

General Remarks and Etiology.—Painful ulcer—fissure—and malignant ulceration having been discussed elsewhere (Chapters XV, L) this chapter is devoted to a study of *simple, infectious*, and *systemic* ulceration of the rectum and anus, of which there are many types.

Anorectal ulcers are frequently encountered, but not so often as inexperienced physicians believe; they are met with in both sexes, all ages, climates, races, different strata of society, and individuals who lead an active or sedentary life.

These lesions may be responsible for pruritus, discomfort, extreme pain, exhausting discharge, hemorrhage, persistent diarrhea, constipation, auto-intoxication, and other manifestations that may partially or completely incapacitate the patient or shorten life when ulceration is extensive and complicated by mixed infection.

Women, owing to injuries sustained during pregnancy and labor, venereal and genital diseases, are said to suffer more frequently from rectal ulcers than men, but the author has observed them about as often in one sex as the other.

Children are occasionally afflicted with fissure caused by the expulsion of hardened feces and erosions and mucous patches incident to congenital lues, but are rarely troubled with ulcerative anorectal lesions common to adult life.

Extensive ulceration (Fig. 411) occurs more often in anemic, debilitated, and cachectic individuals, though specific types, *tubercular, syphilitic, entamebic, and bacillary* (Shiga), when virulent or complicated by diphtheric inflammation often cause rapid destruction of the mucosa.

Bacteria are an important factor in all varieties of anorectal ulcers and may be responsible for delayed healing or extension of ulcers irrespective of their *primary* cause, but destruction of tissue is most extensive and the ulcerative process more difficult to arrest in presence of serious *mixed infection* where *obligate* and *accidental* intestinal organism and tubercle or Shiga's bacilli, Entameba histolytica, or other infectious agents are both active in the same lesions.

Ulcers of the anorectal region may be acute or chronic, single or multiple, painful or non-sensitive, large or small, superficial or deep, ragged or smooth, and limited to the *perineal region, anus, anal canal* (Fig. 411), *rectum*, or be distributed throughout the lower bowel.

Characteristic amebic, balantidic, and Shiga bacillary lesions are confined chiefly to the colon, sigmoid flexure, and upper (*movable*) rectum; while tubercular, syphilitic, varicose, catarrhal, chancroidal, and other ulcers, including lesions originating in the skin, show a preference for the lower (*fixed*) rectum. Inflammatory processes of the sigmoid and anal canal under favorable conditions may extend in either direction and involve the colon, perianal skin, or both.

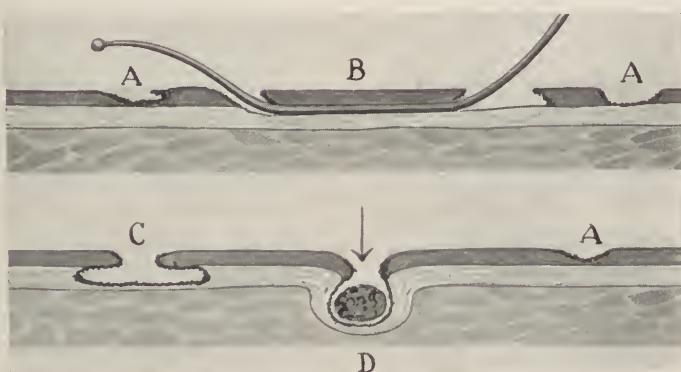


Fig. 408.—Section of rectal wall giving a side-view appearance of ulcers: A, Three degrees of ulceration; B, probe passed through complete fistula connecting two lesions; C, collar-button ulcer; D, diverticulum containing a fecal concretion complicating anorectal ulceration.

Owing to its relation to neighboring organs and skin, anatomic construction, liberal blood-supply, contained pathogenic and pyogenic organisms, frequent traumatism incident to the collection and expulsion of hardened feces, delicate mucosa, ideal lodging place for foreign bodies the rectum is the seat of simple, specific, and mixed infection ulcers very much more frequently than segments of the small and large intestine.

Microscopic and macroscopic lesions here, particularly in the anal canal (Fig. 411), seldom heal spontaneously when neglected, but show a tendency to chronicity and to multiply and extend because they are irritated by retained discharge, traumatized by hardened feces, stretched during defecation, or contaminated by mixed infection.

Lesions comparatively simple in the beginning rapidly extend through neerosis or gangrenous sloughing from ordinary or specific infection (tubercular and Shiga bacilli, entamebæ, *Balantidium coli*, etc.), and are aggravated by old age, trophic disturbances, underfeeding, nephritis, diabetes, hepatitis, anemia, and leukemia.

Often it is impossible to determine whether rectal ulcers are due to the patient's depleted condition, character of intestinal secretions, local changes in the mucosa, or constitutional disease when specific organisms are not demonstrable, or they cannot be accounted for in other ways.

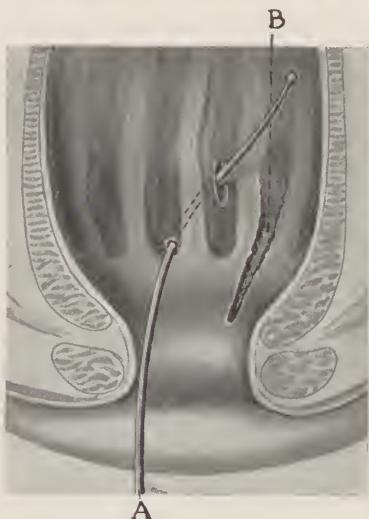


Fig. 409.—Ulcers located in anal crypts connected beneath a Morgagni column by a complete fistula: *A*, Probe, and *B*, crypt destroyed by an elongated ulcer.

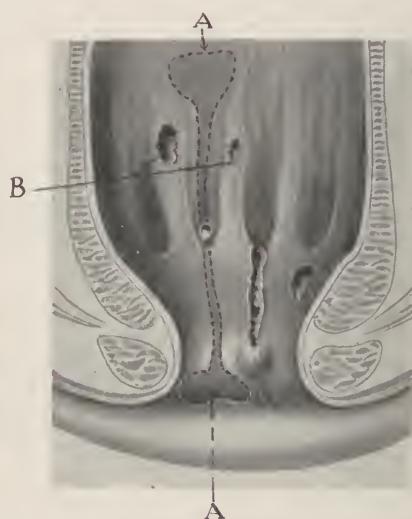


Fig. 410.—Anal canal ulceration: *A*, Blind submucous and subcutaneous fistule having a common opening located in a crypt (semilunar valve); *B*, ulcers. On the right is an ulcer that extended from a destroyed crypt to an anal papilla.

Owing to their varied appearance and many conditions and diseases responsible for them, no attempt has been made to *classify* anorectal ulcers scientifically, and they have been grouped according to their frequency into *rare*, *occasional*, and *common* types.

Rare Types of Ulceration.—Several local and constitutional affections have occasionally been complicated by slight or extensive ulcerative lesions located in the colon, sigmoid flexure, or rectum.

Acute diseases of childhood—measles, scarlet fever, varicella, pertussis, cerebrospinal meningitis, acute poliomyelitis, and diphtheria—have been responsible for diarrhea and exoriation or ulceration in the lower bowel.

Nasopharyngeal, dental, aural, and tonsillar suppurations are sometimes complicated by infection of the small or large intestine and formation of superficial lesions in the mucosa.

Rectal ulceration may complicate Basedow's disease, hepatitis, cholecystitis, nephritis, diabetes mellitus, pancreatitis, Addison's disease, Banti's disease, leprosy, perianal skin lesions, intestinal amyloidosis, osteomyelitis, scorbutus, and septicemia, but disturbed continuity of the rectal mucosa is more often associated with infectious diseases—typhoid, variola, pneumonia, influenza, malaria, typhus, cholera, erysipelas, pellagra, actinomycosis, helminthiasis, anthrax, plague, glanders, intestinal myiasis, yellow fever, beriberi; inflammatory and ulcerative lesions of the rectum have also been observed in connection with pernicious anemia, alcoholism, arteriosclerosis, mesenteric embolism, enterogenic and gastrogenic disturbances, and adolescence.

Proctitis with erosions and ulcers has been a secondary manifestation of ptomain poisoning, rectal etherization, prolonged catharsis, irritating soap—alkali—and medicinal enemata, inhalation or absorption of chemicals—occupational diseases—and extensive burns.

The author has treated many cases of rectal erosions and ulcers induced by bichlorid, iodin, silver nitrate and potassium permanganate irrigations, and employment of caustics or cautery to local lesions.

Schistosomiasis—bilharzia—is sometimes complicated by thickening of the rectovesical septum, fistula, and soft polypoid growths in the rectum that become detached, leaving ulcerated areas difficult to heal.

On account of their rareness and similarity of symptoms and treatment to other ulcers further discussion of the above types of anorectal ulceration would be superfluous.

Occasional Types of Ulceration.—Of uncommon anorectal ulcers the following are the most important:

Cutaneous.	Rodent.	Gangrenous.
Varicose.	Phagedenic.	Verrucose.

Cutaneous Ulceration.—Superficial ulcers at the anal outlet are often associated with, or caused by, dermatologic affections, excepting venereal diseases—*herpetic* and *eczematous* are the skin lesions, most frequently encountered in the scrotal and perianal regions, and they sometimes degenerate into ulcers that induce intolerable pruritus, discomfort and pain while walking, or sphincter-

algia through being irritated and traumatized by defecation, cleaning the anus, and rubbing of clothing.

For a diagnosis of the symptomatology, diagnosis, and treatment of these and other *skin* diseases encountered about the anus and buttocks the reader is referred elsewhere.

Varicose Ulceration.—Ulcers in the anal canal and rectum the result of varicosities (Fig. 411) in the mucosa occasionally encountered in individuals between the ages of forty and seventy years are rare in younger people; such lesions are encountered in men more often than women. Some of the author's patients

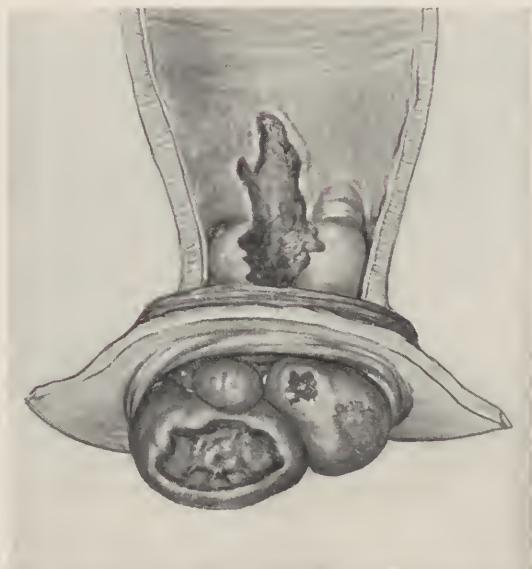


Fig. 411.—Chronic varicose hemorrhoidal ulcers of the anal canal. Note excoriation, small and large ulcers located on the hemorrhoids, and extensive lesions involving the anal canal, the borders of which are thickened and rounded, indicating chronicity and infection.

suffered from cardiac or hepatic disease, tumors or constipation, and fecal impaction that obstructed return circulation, but venous engorgement is partially due to the upright posture assumed by man, absence of valves in rectal veins, and passage of vessels through buttonhole-like slits in the rectum narrowed by contractions of the rectal musculature.

Several times the condition complicated arteriosclerosis, syphilitic endarteritis, or hemorrhoids not in close proximity to ulcers. In this condition veins are enlarged, tortuous, equally distributed about sides of the rectum, and give to the mucosa a vermiculo-

nodular appearance when seen through the proctoscope, and are easily detected upon digital examination.

There is a similarity between varicose ulcers of the extremities and rectum, since both are secondary to defective circulation and varicose veins that enlarge at definite points, and as a result of pressure inflammation, traumatism, and infection eventually lead to degeneration and breaking down of overlying tissue.

Varicose ulcers may extend from Hilton's white line to the upper margin of the anal canal, have raised, non-indurated, irregular borders, reddish, unhealthy bases, are covered with a whitish secretion, and chronic, persisting for months or years regardless of treatment. At first they are small and single, but later, as vein walls break down, infection takes place, irritating matter collects in them, or they are lacerated during defecation, lesions slowly extend individually or coalesce and form one or more large, non-sensitive raw areas, that bleed slightly or profusely. These lesions are often confused, but should not be mistaken for hemorrhoidal ulcers located upon the surface of pile tumors that project into the rectum or extrude through the anus.

In neglected cases sooner or later feces, pathogenic and pyogenic micro-organisms, or foreign bodies lodge in varicose ulcers leading to the formation of submucous or deeper abscesses, fistula, or general infection.

In addition to treatment elsewhere recommended for other lesions varicose ulcers require special treatment—therapeutic measures to correct the disease or condition responsible for venous blocking, absolute rest in bed, restricted diet, laxatives to soften feces, frequent cleansing irrigation, and occasionally incision of an irritable sphincter and insertion of a gauze pledge saturated with balsam of Peru, or ichthyol, 10 per cent., to stimulate healing and insure drainage of the anal canal.

When the usual therapeutic agents fail, varicosed ulcerated mucosa are excised after the plan of Whitehead (Fig. 352), an unjustifiable operation for internal hemorrhoids. Pain is prevented or alleviated by hot oil and bismuth or boric acid injections, or insertion of suppositories containing cocaine or morphin, gr. $\frac{1}{8}$ (0.008), and belladonna, gr. $\frac{1}{4}$ (0.016), after stool.

As a last resort an artificial anus is made that the bowel may be put completely at rest, and ulcers kept clean and treated individually.

Rodent Ulceration.—In contradistinction to phagedenic, rodent is a chronic form of ulceration that requires weeks or months to accomplish the degree of destruction resulting from the former in a few days.

This condition is frequently confused with anal epitheliomatous ulceration, but differs in that it more readily responds to treatment, does not cause induration, is not complicated by metastasis or involvement of deeper tissues, and shows a preference for mucosa instead of the skin.

Rodent ulcers are *slowly progressive*, and regardless of local treatment gradually extend until they destroy large areas of mucous membrane, dissect the rectum from its attachments, destroy the sphincter, or extensively involve the skin.

The causation of this distressing affection is not known, but mixed infection and lowered vitality are undoubtedly etiologic

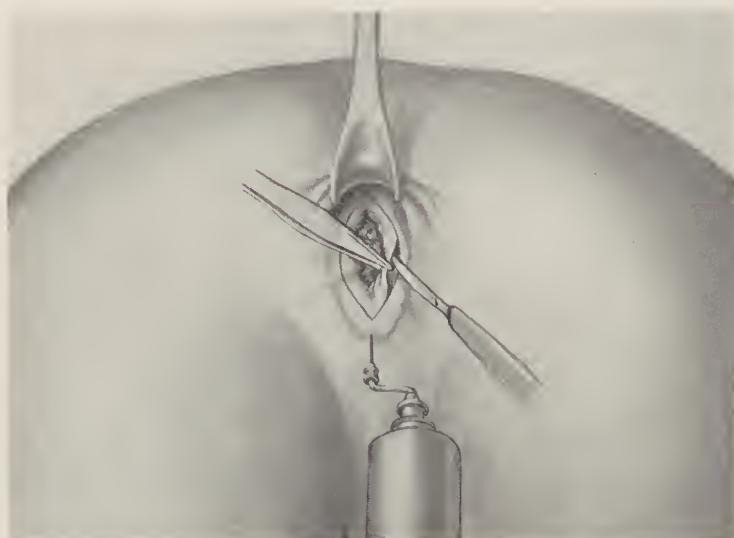


Fig. 412.—Phagadenic ulcer being excised under local anesthesia.

factors and traumatism by feces and clothing greatly aggravates these lesions.

Bases of rodent ulcers are often devoid of secretion, dry and glistening, their borders are reddish, raised, and irregular, and the shape of the lesions depend on their extent, location, and degree of contraction of adjacent anorectal muscles.

Since *treatment* employed to heal other types does not arrest rodent ulcers, time is not wasted with *non-operative* measures, and instead *colostomy* is performed or the diseased area *excised* early. Inoperable lesions in the skin are best treated with electrolysis, x -rays, fulguration, actual cautery, or arsenic paste, followed by soothing applications reinforced when imperative by the establishment of an artificial anus.

Phagedenic Ulceration.—Almost any type of anorectal ulcer may assume phagedenic characteristics if neglected, lesions are repeatedly traumatized and infected by feces, burned with acids or cautery, and when the patient is anemic or debilitated, suffers from diabetes, albuminuria, systemic or circulatory disturbances. Phagedenic complicate chancroidal and mucous patches more often than other anal ulcers and seldom extend above the anal canal, but often attack mucosa about Hilton's white line, and frequently destroy the sphincter muscle, perianal skin, and deeper structures.

Destruction of tissue is rapid, and unless ulceration is promptly arrested function of the rectum and sphincters (Fig. 412) is permanently impaired, and a large unhealthy wound requiring weeks or months to cure is left.

Phagedenic has been confused with *phlegmonous* ulceration, but without reason, since extensive sloughs do not resemble this condition.

Treatment consists in directing measures against infection—restricting diet, having the patient rest in bed, securing evacuations by enemata, irrigating the wound, excising *necrotic and overhanging mucosa and skin edges*, making topical applications of methylene-blue or balsam Peru, 10 per cent., alternated with injections of warm oil and bismuth, and in draining deep crevices with gauze pledges.

Caustics are prohibited, but ichthyol, 15, argyrol 25, or silver nitrate, 6 per cent., hasten healing after granulations have been encouraged with milder agents.

In 3 instances, after other measures failed, the author succeeded in curing persistent phagedenic ulceration by *colostomy*, reinforced by the above treatment, and in only one instance (Fig. 412) has he found partial rectal extirpation necessary.

Diphtheric Ulceration.—Extensive sloughing of the recto-



Fig. 413.—Extensive rectocolonic diphtheric ulceration that complicated diphtheria in a case autopsied by the author.

colonic mucosa followed by stricture-forming ulcers is sometimes associated with diphtheria (Fig. 413). The condition is rare, and the author has observed only 3 cases including that shown in the accompanying illustration (Fig. 413).

Early, grayish patches are present, but later the membrane separates, infected areas extend and become necrotic, when the patient exhibits toxic manifestations, diarrhea, profuse discharge, and sometimes loss of blood.

Rectal diphtheric coloproctitis is secondary to throat involvement, and swallowed Klcb's-Löffler bacilli survive action of the gastro-intestinal secretions, which inhibits but does not destroy their virulence, evidence of which has been found in positive cultures obtained from intestinal discharges and tissue.

Pseudodiphtheric membranous inflammation of the colon and rectum simulating true diphtheric phlegmon is frequently associated with *bacillary* (Shiga) and *entamebic* colonic infection.

Sometimes the membrane is superficial, but at others the inflammatory process causes extensive destruction of tissue, leaving denuded areas variable in size.

A similar condition has been observed the result of *pneumococcic* rectal infection which is primary or secondary to pneumonia.

Pseudodiphtheric membranous coloproctitis is more often observed in individuals having poor circulation and those afflicted with chronic exhausting diseases.

The *manifestations* of rectal are the same as those of tonsillar diphtheria plus an exhausting diarrhea, abdominal soreness, or cramps and bloody evacuations, containing an offensive discharge and grayish or necrotic membranes.

The symptoms of pseudomembranous resemble those of other forms of ulcerative proctitis, and the patient complains of rectal tenesmus, passage of pseudomembranous casts, or extensive pieces of sloughing mucous membrane.

The *treatment* of diphtheric and other forms of membranous *rectitis* causing extensive ulceration requires the utmost care, and when therapeutic measures, elsewhere recommended for the treatment of rectal ulcers, are not effective, *rectal excision*—proctectomy—or an *artificial anus* to put the bowel at rest is necessary. Local treatment is reinforced by antitoxin in true diphtheria, and serum in bacillary proctitis.

Gangrenous Ulceration and Abscess—Phlegmon.—Anorectal phlegmon is a rare and serious condition, because unless promptly arrested it is accompanied by rapid destruction of small or large

segments of the mucosa and occasionally rectal musculature, sphincter muscles, and perianal skin.

Gangrene in this locality may be induced by extra-intestinal pressure, extension of necrotic processes to the bowel, foreign bodies, severe injuries, hot enemata and irrigations, turpentine injections, careless introduction of instruments and enema tubes, operations—rectal resection and amputation—that destroy the circulation, and extravasation of urine into the perirectal tissues, but more frequently phlegmon of the rectum and adjacent tissues is caused by *virulent infection*, where a single type or different micro-organisms participate.

Usually sloughing is preceded by trauma, acrid discharge, catarrhal proctitis, or specific infection of the rectum caused by *entamebæ*, *Shiga bacilli*, *tubercle bacilli*, *gonococci*, or worms responsible for microscopic and macroscopic lesions that offer a point of entrance for more destructive pathogenic agents, chiefly known to cause necrosis—*colon bacilli*, *Fränkel's pneumococcus*, *Bacillus aërogenes capsulatus*, *B. proteus vulgaris*, *B. phlegmonous emphysematosæ*, *B. perfringens*, *streptococci*, and *staphylococci*.

Often *emphysematous phlegmon* is traceable to *anaërobic organisms* in association with *colon bacilli* which under favorable circumstances cause sloughing and production of gas, evidenced by their frequent presence in the discharge from air abscess and gangrene.

The author treated 2 men for extensive phlegmon that dissected the urethra and rectum from their attachments, partially impaired the sphincters, and destroyed the subcutaneous fat of the perineum and buttocks for several inches on either side of the anus within forty-eight hours from the time the infection was discovered. The skin drooped inward and an abundant thin, dark greenish discharge escaped from punctured tissues. Following removal of large areas of integument enormous detached *black sloughs* were wiped away with gauze, leaving cavities in and outside the rectum that required months to heal. These patients were admitted *pederasts*, suffering from gonorrhœal proctitis, and while *colon bacilli* and *streptococci* were present in the discharge and removed tissue, the author is convinced the phlegmon originated in a *gonococci* infection.

Neither patient had a temperature or complained of pain, but both suffered uneasiness about the anus and *crepitus* was detected on palpation. Rectal gangrene has also been attributed to arteriosclerosis, endarteritis, embolism of the inferior mesenteric and superior hemorrhoidal arteries, diabetes, albuminuria, strangu-

lated procidentia recti and hemorrhoids, carbolic acid and quinin and urea injection of piles, injuries due to parturition, and Guibe has reported 6 cases of spontaneous rectal gangrene.

Venezuelans and Fiji Islanders are frequently attacked by epidemic gangrenous rectitis termed by them "Bichio," an exceedingly contagious infection, phagadenic in character, that also attacks fowls and animals.

This variety of phlegmon which may start in the colon or at the anus is characterized by virulent inflammation of mucosa, diarrhea, dribbling through the anus of a semifluid, fetid, greenish and blood-tinged discharge, tenesmus and rectal procidentia followed by neuroses, and usually terminates fatally from toxemia or exhaustion.

Treatment consists in removing sloughs, employing autogenous vaccines, purgation, astringent irrigations, and powdering the perianal skin to prevent irritation caused by the discharge.

Gangrenous ulceration and abscess is an occasional complication of bacillary and entamebic infection, and has also been induced by pneumococci and bacilli of malignant edema.

The *symptoms* of *gangrenous* differ from ordinary ulceration in the absence of pain, subnormal temperature, greenish hue of the skin, feeling of bogginess, crepitation or fluid beneath the integument, thin fetid discharge admixed with necrotic tissue, slight tenesmus and absence of sphincteralgia, and non-sensitive wound when necrotic tissue has separated.

The *treatment* depends on whether the phlegmon is slight or extensive, for when destruction of tissue is great a cure is facilitated by putting the bowel at rest by *colostomy*, but in less severe cases following *removal of sloughing* tissue healing is hastened by frequent boric or ichthyol irrigation, insertion of gauze drains, and employment of silver nitrate, 6 per cent. applications.

Complicating abscesses and fistulæ are freely incised, curedt, and drained. Subsequently a plastic operation upon the bowel or sphincter may be required.

The *prognosis* is usually good when the gangrenous process is promptly arrested by operation, but convalescence is slow on account of extensive wounds which heal by granulation.

The author treated 2 patients who died from edema of the lung secondary to anorectal sloughing caused by carbolic acid injection of hemorrhoids made by advertising quacks, and has handled other cases suffering from enormous wounds (Fig. 328) produced by this agent or quinin and urea infiltration.

Verrucose Ulceration.—Warty excrescences are occasional complications of leukorrhea, gonorrhœa, tubercular, syphilitic, and other

affections accompanied by an irritating or infectious rectal discharge. Condylomata acuminata are usually caused by *non-specific*, and condylomata lata by *luetic* secretions.

Both types of vegetations tend to multiply, collect in groups, and form large or small masses that project from the perianal skin and mucosa.

In rare instances the result of disease, infection, traumatism by the feces and clothing, or application of cauterizing agents, warts degenerate or become detached, leaving diminutive or large ulcerated areas upon skin and mucosa which, owing to irritation from an acrid discharge and bacterial activity, become chronic and extend if not promptly healed, and have been known to take on phagedenic characteristics.

The chief *symptoms* are discharge, pruritus, smarting about the anus, sphincteralgia, disgusting odor, painful defecation, and soiling of clothing.

The *treatment* varies, but multiplication of warts is prevented by bathing the parts with antiseptic solutions, keeping buttocks separated with silk or gauze, drying and dusting the parts with powder composed of equal parts of zinc stearate, tannic acid, and calomel. Astringent medication shrinks *non-specific*, and calomel destroys *syphilitic* warts at their inception, but after condylomata have coalesced into ulcerating mucosa a cure is impossible except by removing them with cautery or scissors, or excising them following infiltration of the skin with eucain.

Common Types of Ulceration.—It remains for the author to enumerate and discuss the more frequent forms of ulceration encountered in the *movable rectum*, *anal canal*, and *perianal region*, of which the majority are infectious:

- | | |
|------------------|---|
| 1. Catarrhal, | 8. Entamebic, |
| 2. Follicular, | 9. Balantidic, |
| 3. Hemorrhoidal, | 10. Bacillary, |
| 4. Traumatic, | 11. Helminthic, |
| 5. Tubercular, | 12. Venereal—syphilitic, chancroidal,
gonorrhreal, |
| 6. Lupoid, | 13. Strictural, |
| 7. Esthioménic, | 14. Cancerous. |

Catarrhal Ulceration.—Catarrhal proctitis (Fig. 414), hypertrophic (moist) or atrophic (dry), in the author's opinion, is the most frequent cause of rectal erosions and ulcers.

The factors behind the condition are manifold—dietetic errors, exposure, climatic changes, contaminated water or food, irritating

enemata and irrigations, careless instrumentation, constipation complicated by fecal impaction, gastrogenic and enterogenic disturbances, local and general, infectious diseases, and extension of disease from the sigmoid or neighboring organs to the rectum.

Catarrhal inflammation incited by the above or other causes is at *first* characterized by congestion, thickening or edema of the mucosa, *later* by punctate wounds or superficial erosions or excoriations variable in size, and *finally*, by clearly defined, shallow, raw areas or deeper ulcers that may be single or scattered throughout the rectum (Fig. 414).

Such lesions, if neglected through the pathogenicity of intestinal micro-organisms, rapidly multiply and extend in size and depth until they assume serious proportion.

Catarrhal ulcers and inflammation are more frequently responsible for rectal stricture than other affections common to this region.

Chronic, catarrhal, inflammatory, and ulcerative proctitis is often complicated by abscess, fistula, polyps, hypertrophied anal papillæ, cryptitis, and sphincteralgia, because lesions here afford ideal lodging places for micro-organisms, foreign bodies, and points of entrance into the blood-vessels or lymphatics for bacteria and toxins, which lead to local or general infection or auto-intoxication with its manifestations and distressing end-results.

Where continuity of the bowel epithelium has been disturbed a mucous or mucopurulent discharge seeps through the anus, causing dermatitis or erosions in the skin which add to the patient's discomfort by causing pruritus ani, rectal tenesmus, or sphincteralgia.

When properly treated, catarrhal proctitis, unless complicated by tubercular, syphilitic, entamebic, Shiga bacillary, helminthic, gonorrhreal or mixed infection, seldom reaches the *ulcerative* stage, hence the advisability of early proctoscopic examination and treatment.

Manifestations of catarrhal ulcers depend on whether they are acute or chronic, numerous, large or small, or complicate colitis, hemorrhoids, abscesses, etc.

In mild cases stools are slightly increased, softened, and contain a slight amount of glistening jelly-like mucus or casts tinged with blood, but when ulcers are numerous and deep, evacuations are frequent, fluid, offensive, irritating, and contain an abundance of mucus, considerable blood, some pus, and tissue *débris*.

The symptoms of ulcerative proctitis are not entirely local, for these sufferers are extremely nervous, do not digest food, and complain of hyperperistalsis, putrefactive changes, auto-intoxica-

tion, lymphangitis, uneasy sensation in the colon, and reflex rectal manifestations where terminal nerve filaments are exposed.

Follicular ulceration (Fig. 414) is not an entity, because it often complicates catarrhal, tubercular, syphilitic or entamebic coloproctitis, or is induced by traumatism incident to hardened feces, foreign bodies, or lodging in follicles of irritants or fecoliths.

Inflammation in and between solitary glands soon lead to desquamation through degeneration of overlying epithelium, and swelling or rupturing of follicles through distention.

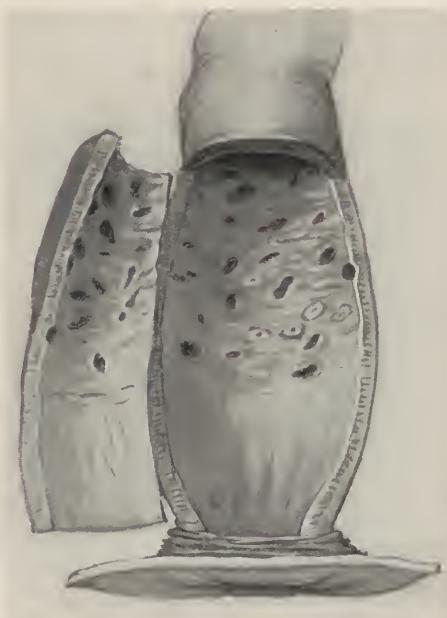


Fig. 414.—Catarrhal follicular ulceration of the rectum showing distended breaking down follicles and clearly defined ulcers.

Follicular proctitis can be differentiated at this stage, but later, when the mucosa is ulcerated and involved in mixed infection, it is impossible to differentiate between rectal ulcers starting in the solitary glands from lesions originating in other ways.

Hemorrhoidal Ulceration.—Hemorrhoidal (Fig. 415) are more frequent than varicose ulcers (Fig. 41) located upon pile tumors, are not extensive, seldom complicate constitutional disease, and are more easily cured. They appear in the later stages of hemorrhoidal disease after tumors have obtained considerable size, project into anal canal and extrude through anus, following which they are daily traumatized during defecation, by rubbing of

clothing, and being returned above the sphincter after stool. In consequence, the fragile covering of the mucosa is injured and becomes infected. Hemorrhoidal ulcers are superficial, small, and bleed slightly or profusely during or following stool, depending on size of the venous terminals involved.

Occasionally large areas overlying hemorrhoids are excoriated by patent or proprietary remedies, insertion of astringent suppositories, topical applications, hot fomentations, injections, careless introduction of enema tubes or rectal specula.

Frequently the author has observed extensive destruction of pile tissue or segment of the rectum including the sphincter resulting from carbolic acid (Fig. 328) or quinin and urea injections



Fig. 415.—Inflamed edematous external hemorrhoids and ulcerated internal hemorrhoids some of which are strangulated.

made into hemorrhoids, or from the strangulation of tumors caught in the sphincter (Fig. 415).

The *symptoms* of hemorrhoidal are about the same as those of varicose ulcers, except the patient complains of swelling or protrusion, sphincteralgia, and desire to defecate after piles have been returned.

The *diagnosis* is made by exposing ulcerated piles with a slide speculum or author's anoscope when they do not protrude.

The *palliative treatment* of hemorrhoidal is the same as for other anorectal ulcers except protruding piles are promptly cleansed, treated, and returned after each evacuation, and cold astringent compresses are applied to shrink and keep the tumors above the sphincter.

Once hemorrhoids ulcerate and bleed they are promptly infiltrated with eucain ($\frac{1}{8}$ per cent.), dissected upward, ligated, and excised, because otherwise if one succeeds in healing ulcers they recur shortly.

Traumatic Ulceration.—Traumatism is an important factor in anorectal ulceration. Diminutive and larger lesions in and adjacent to the rectum induced by bruising, stretching, or laceration, owing to the action of colon bacilli, streptococci, Pyogenes albus, and other organisms, enlarge and become chronic unless they are kept clean, stimulated, and irritation from feces and friction of clothing is prevented.

Traumatic ulceration may result from expulsion of hardened fecal masses, introduction of finger, proctoscope, dilator, bougie, or enema tip, forcible divulsion of sphincter, lodgment or passage of foreign bodies, injuries occurring during labor, operations (pelvic, vesical, rectal), falling upon sharp or ragged objects, bullet, shell, and stab wounds; rectal masturbation and pederasty; electrolysis or fulguration, instrumentation (rectal, urethral, vaginal); prostatic massage, vibratory treatments, extra- and intra-intestinal pressure from an enlarged prostate, tumor in neighboring organs, adhesions, pessaries, fecal impaction, vesical and prostatic calculi, irritating or hot-water injections, and application of cauterants, suppositories, or so-called pile cures.

Traumatic ulcers may be encountered anywhere, but occur most often in the lower anal canal, where they remain localized or extend in either direction if neglected or the patient is tubercular, anemic, or debilitated from other causes. As result of specific or *mixed infection* complicated by constipation and frequent evacuation of scybalæ, lesions originally unimportant assume serious proportions unless promptly cured.

The most extensive traumatic ulcers result from the carbolic acid injection of hemorrhoids, Whitehead's operation, rectal extirpation and fistula, abscess, procidentia and stricture operations, extravasation of urine, and external injuries with extensive laceration and necrosis of the rectal wall incident to passage of a child's head.

Traumatic lesions may be acute or chronic, large or small, shallow or deep, smooth or ragged, variable in shape or phagedenic in character, and be characterized by a slight mucous or free discharge composed of mucus, pus, and blood when infection is virulent and the wound is uneven, and drainage is poor.

The *symptoms* of traumatic simulate those of other anorectal ulcers except when injury is extensive and patient exhibits mani-

festations of large infected areas plus irritation, complains of intense pain from defecation and repeated soiling of the wound, and in such cases the *diagnosis* is based chiefly on the history of trauma.

Briefly summarized, the *treatment* of traumatic ulceration embraces frequent cleansing of lesions, excision of overhanging fresh or necrotic edges of skin and mucosa, free drainage, incision or divulsion of the anal muscle when there is sphincteralgia, application of *mild* (methylene-blue, 10 per cent.) to *fresh* and *stimulating* agents (ichthylol, 25, or silver nitrate, 8 per cent.) to *sluggish* ulcers, and destroying exuberant granulations with scissors, copper stick, cautery, or fulguration.

Extensive traumatic rectal ulcers that do not respond to the above treatment and medicated irrigations require *colostomy*, with or without counterdrainage, to put the diseased bowel at rest and facilitate treatment or extirpation of the involved segment of gut when more conservative measures fail.



Fig. 416.—Typical encircling tubercular girdle ulcer of the rectum.



Fig. 417.—Numerous tubercular ulcers of the rectum, some of which have coalesced to form deep raw areas. (Army and Navy Museum.)

Tubercular Ulceration.—Rectal and perianal ulcerating tuberculosis may be *primary*, but in more than 90 per cent. of cases infection is *secondary* to pulmonary or intestinal tuberculosis. About 3 per cent. of consumptives suffer from tubercular fistulæ or ulcerative lesions at the anus or vicinity.

From a viewpoint of prognosis there are three types of anorectal ulceration in tubercular subjects—*simple* ulcers of *traumatic* origin that heal slowly owing to lowered vitality from pulmonary tuberculosis, lesions *primarily* tubercular, and tubercular ulcers still more difficult to heal because they are *secondary* to pulmonary foci.

Formerly anorectal tubercular ulcers and fistulæ were considered incurable, but the author has cured several patients whose vitality had not been greatly lowered. It is not wise to predict

the time it will take to heal anorectal tubercular lesions, because under favorable conditions and proper treatment some heal in a few weeks, while others require months or prove incurable.

In neglected cases when parts are not frequently cleansed of discharge hypertrophic changes occur in the skin and warts—*tuberculosis verrucosa* resembling condylomata acuminata form.

Anorectal tuberculosis is met with more frequently among the poor who live in unhygienic surroundings, and whose occupations are arduous and subjects them to exposure, than in individuals in comfortable circumstances.

Individuals suffering from primary anorectal lesions do not exhibit the typical characteristic appearance noticed in persons afflicted with rectal infection secondary to pulmonary tuberculosis.



Fig. 418.—Extensive tubercular lesions, of which the one on the right has almost perforated the rectal tunics.

Tubercular ulcers may involve the rectum, anal canal, or perianal region, but lesions are encountered about the anal margin more frequently than higher up.

Rectal Tuberculosis.—Tuberculosis (Fig. 418) of the movable rectum occurs less often than is believed, and is encountered in the ulcerative neoplastic and fibrosclerotic types of intestinal infection which are frequently complicated by enlargement of mesenteric, retroperitoneal or omental glands, and destruction of the mucosa to a greater or lesser degree.

Superficial and deep ulcers usually result from deposits that undergo caseation and form lesions variable in size, depth, and appearance on the anterior rectal wall that are aggravated and extend through mixed infection. These ulcers are frequently

associated with tuberculosis of the genito-urinary organs, and unless the process is arrested, coalesce, attack deeper bowel tunics, and cause abscess, ordinary or rectovesical fistula, septicemia, or perforation and peritonitis. When inspected through the proctoscope they show ragged, unhealthy excavated edges, and a grayish base dotted with tubercles (Fig. 421) smeared with a mucopurulent discharge and surrounded by an inflamed edematous mucosa.

Extensive lesions (Figs. 420, 421) freely exude an offensive, irritating, whitish, blood-tinged discharge responsible for burning pain, tenesmus, and sphincteric irritability, manifestations that are aggravated by diarrheal evacuations. These ulcers tend to heal

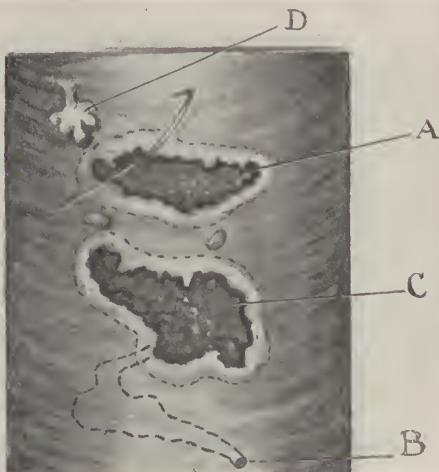


Fig. 419.—Typical encircling tubercular ulcers: *A* and dotted lines indicate undermined edges of mucosa; *B*, complicating fistula; *C*, caseating tubercles; *D*, polyp. Note fishbone lodged in an ulcer and small papillomata beneath the lesion.

at one place as they break down at another, show a tendency to girdle formation (Fig. 419), and may be responsible for stricture, and tissue removed from them may contain miliary tubercles, tubercle bacilli, giant-cells, and considerable fibrous tissue.

Hyperplastic Tubercular Ulceration.—Intestinal hypertrophic-neoplastic—tuberculosis is rare, most often attacks the cecum or rectum, and is usually mistaken for cancer, which is inexcusable, since the former requires years, and malignant growths take only months to develop a tumor sufficiently large to obstruct the bowel.

Infection may be caused by human or bovine tubercle bacilli, originates in the submucosa, and is characterized by a progressive proliferating hyperplastic proctitis that extends around the bowel

or forms an encapsulated unilateral, firm, resisting, flat tumor. Neoplastic tubercular outgrowths extend in either direction from the submucosa, enlarging the bowel externally and blocking it internally, and have also been confused with gumma and sarcoma.

Neoplastic tuberculosis progresses for years or until obstruction ensues (Fig. 765), and the tumor mass then degenerates to form superficial or crater-like ulcers, with or without pulmonary complication, as this type of infection is frequently primary. These neoplasms are agglutinated to adjacent structures, 1 inch (2.54 cm.) or more in thickness, and resemble cartilage when incised, and gut proximal to the tumor is dilated, thinned, or ulcerated, the mucosa of the involved segment is atrophied, thrown into longitudinal



Fig. 420.—Tubercular proctitis complicated by mixed infection ulcers; fistula connecting lesions and creasing of mucosa induced by cicatrices.

rugae, and proliferating proctitis is frequently associated with pedunculated adenomata or papillomata variable in number, size, and shape.

Obstruction rather than ulceration typifies neoplastic rectal tuberculosis, hence these patients in turn seek relief from constipation, obstipation alternating with loose movements, and finally, diarrhea with persistent straining.

Fibrosclerotic—Stenosing, Atrophic—Tubercular Ulceration.—In this form of rectal tuberculosis bowel tunics are involved in sclerotic changes that convert the gut into a rigid tube (gas-pipe intestine) induced by a persistent, low-grade inflammation, supposedly incited by a virulent toxin that attacks the submucosa.

Here ulceration follows instead of preceding stricture, since ulcers seldom if ever appear until there is partial or complete obstruction, which is later complicated by the formation of stercoral ulcers in and above the block caused by impacted fecal masses and pressure necrosis and infection.

The author has observed the condition a few times, a typical specimen of which is shown in the accompanying illustration, and believes that in the majority of cases so-called gas-pipe intestine results from ulceration and cicatrization or hyperplastic changes.

Anal Canal Tuberculosis.—The fixed rectum, or tube-like anal canal, is frequently the seat of tubercular ulcers difficult to heal because daily traumatized during defecation, irritated by sphincteric contractions, and rubbed by clothing.



Fig. 421.—Primary tuberculosis cutis ani, lesions which after attacking perianal skin extended into the lower rectum, destroying mucosa and sphincter.

Hyperplastic and fibrosclerotic tuberculosis are rarely encountered in the anal canal, but superficial and deep lesions, with or without tubercles, and the destructive process may enlarge in either direction. Plugging of denuded areas with feces keeps them irritable, and partially due to mixed infection they rapidly extend in depth and breadth until the mucosa and perianal skin are destroyed, leaving large ulcers with undermined, serrated edges; a condition frequently observed among negroes suffering from syphilis and tuberculosis (Fig. 421).

Anorectal tubercular ulcers (*girdle*) may be single or multiple and limited, or extensively destroy the mucosa, but anal-canal

lesions appear to parallel the long axis of the bowel owing to their being squeezed by the sphincter and levator ani muscles. Nature at times attempts to throw a connective-tissue barrier around tubercular ulcers to prevent extension by way of the lymphatics.

Miliary tubercles are secondary and met with in patients debilitated through pulmonary or general tubercular infection. In such cases diminutive whitish nodules are visible in the skin, mucosa, or upon the surface of denuded areas (Fig. 421) prior to caseation and breaking down of surrounding tissue.

Perianal tubercular ulcers (Fig. 421) vary in size and shape, but tend to coalesce to form large, irregular, livid, sensitive lesions having sharp, defined edges that droop inward, remain superficial, or attack deeper structures in and about the anus, and rarely heal because of complicating intestinal or pulmonary tuberculosis.

Diminutive superficial or deep abscesses and fistulae frequently complicate tubercular and mixed infection ulcers of the anal canal and skin. Perianal tuberculosis seldom if ever causes anal stricture, and stenoses from healed rectal lesions are rare. Infection starting in the integument approaches, but usually stops at the anus, and when the mucosa and skin are extensively involved, *extra-* is usually secondary to *intrarectal* tuberculosis; tubercular are less sensitive than other ulcerative lesions met with in the perianal region.

Tuberculosis verrucosa—warty, papillomatous excrescences—are secondary and caused by exoriating discharges from intestinal tuberculosis. These vegetations are soft, club-shaped, pinkish, single or grouped, distributed over the anal mucosa and skin, and resemble condylomata acuminata and lata. When warts break off or degenerate, ragged fissure-like ulcers, exuding an offensive discharge, appear.

The *symptoms* of tubercular anorectal simulate those of other types of ulceration; patients exhibit the constitutional characteristics of the disease elsewhere and complain of slight local tenderness and pain.

Frequently the colon and sigmoid are involved and digestive disturbances and diarrhea are annoying. When the perianal skin is ulcerated by esthiomène, lupus, or tubercular lesions, patients suffer from burning pain, pruritus ani, excoriation of perianal skin, discomfort while exercising, and dressings and underwear are constantly soiled with an offensive discharge.

Tubercular ulceration is *diagnosed* through obtaining a previous history of pulmonary or intestinal tuberculosis, appearance of the patient, chronicity of lesions, presence of tubercles, and finding of tubercle bacilli in removed tissues or the discharge.

The *treatment* of anorectal tubercular ulceration, including lupus, to be successful requires unlimited patience and considerable ingenuity, and in favorable cases weeks or months are required to arrest ulceration (see chapter devoted to Anorectal Tuberculosis).

Lupoid Ulceration—Lupus Exedens.—Anorectal lupus is encountered in individuals having a tubercular predisposition, and characterized by an insidious, constantly progressing ulceration that remains superficial or penetrates deeply, extending over a wide area.

Infection may be primary, but is usually secondary to pulmonary and intestinal tuberculosis, and sooner or later mixed infection ensues and the ulcerative process extends until the lower rectum, sphincters, adjacent skin, and vulva are markedly distorted or destroyed.



Fig. 422.—Amebic coloproctitis showing round ulcers on left and partially healed ulcers and cicatrices on right.

Occasionally lupus remains superficial, causing reddish blotches upon skin or superficial lesions, variable in size, that heal or coalesce and form more extensive denuded areas (Fig. 472). The edges of lupoid ulcers are livid, irregular in shape, sharply defined and undermined at initial points of infection, but later become indurated, sensitive, of a lighter hue, their bases are dotted with tubercles or covered with grayish granulation, and adjacent parts are smeared with a thin, irritating, seropurulent secretion.

In the author's cases perianal lupus has not complicated simple or tubercular fistula, but has sometimes undermined both mucosa and skin.

Frequently it is impossible to distinguish between perianal lupus and esthiomène—ulcerative elephantiasis (see Chapter

XLII). Perianal lupus may assume a phagedenic character and quickly exhausts the patient, but usually the disease is chronic and terminates fatally in from six to thirty-six months unless lesions heal by cicatrization. The reader is referred elsewhere for a more detailed discussion of perianal lupus.

Amebic—Dysenteric—Ulceration.—Rectocolonic infection the result of *Entamebae histolytica* (Fig. 422) is encountered with increasing frequency since the United States acquired Porto Rico, the Philippines, and Hawaiian Islands, and closer commercial relations have been established with Central and South America.



Fig. 423.—Amebic coloproctitis. Note stellate ulcers (Army Medical Museum).

Protozoa are usually carried to the bowel by polluted water or infected food, but amebiasis has ensued from scratching the anus and eating from unclean utensils.

Entamebic ulcers (Fig. 423) are usually scattered throughout the colon, sigmoid flexure, and rectum, occasionally involve the ileocecal valve and lower ileum, but rarely attack the anal canal, thereby differing from tubercular and venereal lesions.

These ulcers are larger, more numerous in the sigmoid flexure and rectum than higher up, which is fortunate, since they are easily inspected and treated through the proctosigmoidoscope.

Shortly following infection by entamebae intestinal follicles become congested and swollen, which is followed by degeneration

of overlying epithelium and formation of microscopic lesions that maintain their individuality or coalesce to form macroscopic superficial, *stellate*, *round*, or *irregular* shaped ulcers (Fig. 423) in different segments of the bowel. At this stage denuded areas are characteristic of amebiasis, but soon lose their identity owing to *mixed infection* participated in by colon bacilli, streptococci, and other organisms.

When mixed infection is virulent the mucosa and deeper tunics become riddled with small new and large older ulcers that undermine the mucous membrane and communicate with each other through fistulous channels (Fig. 427). In such cases the patient is rapidly exhausted by persistent diarrhea, abdominal pain, tenesmus, toxemia, and discharge composed of pus, blood, and mucus.



Fig. 424.—Ulcers and scars from healed lesions of chronic amebic colitis (Army Medical Museum).

When air bacilli, pneumococci, or gonococci are active, extensive sloughing or gangrenous abscess is sometimes a complication in deplorable entamebic infections, under which circumstances prognosis is unfavorable unless the necrotic process is promptly arrested by operation and drainage.

Patients have died through the absorption of toxins in acute malignant entamebic coloproctitis before onset of the ulcerative stage, and occasionally the mucosa is of a purplish hue and covered with diphtheroid patches that disappear or through necrotic changes cause disintegration of the mucosa and formation of ulcers variable in size and shape.

Fatal gangrenous (fulminating) entamebic coloproctitis, hepatic and metastatic abscess, fistula, skin eruptions, profuse hemorrhage, and perforation are occasional complications of amebiasis.

The *symptoms* of entamebic ulceration vary according to duration and virulence of the infection, but typical manifestations are abdominal pain and tenderness, frequent evacuations containing mucus, blood, pus, and shreds of tissue, tenesmus, irregular temperature, digestive disturbances, anemia, toxemia, and exhaustion.

The *diagnosis* is established by finding *Entamebae histolytica* from scrapings of ulcers or evacuations. Repeated examination of stools for helminths, *Balantidium coli*, tubercle bacilli, Shiga, and other organisms is necessary that these infections may be excluded. Dead entamebae may be overlooked, but living are easily distinguished by extension and contraction of their pseudopodia during locomotion.



Fig. 425.—Polyposis complicating amebic ulcerative colitis.

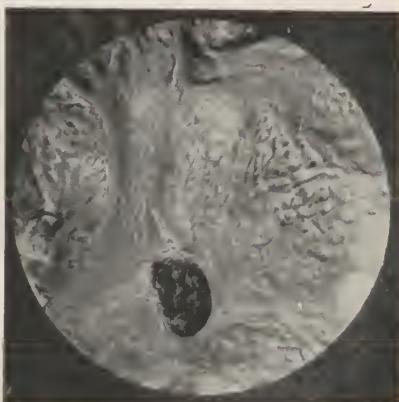


Fig. 426.—Penetrating amebic ulcer.

Acute entamebic ulcers seen through the proctoscope are usually stellate (Fig. 427, A) in form, but chronic lesions are variable in shape (Fig. 423), deep, have a grayish base, and reddish undermined edges (Fig. 427, C). Occasionally necrotic tissue or diphtheric membranes (Fig. 428) are observed, but these conditions more frequently complicate bacillary than entamebic proctitis. These lesions occasionally perforate the rectum and colon (Fig. 426).

The *prognosis* is good in properly treated and bad in neglected cases complicated by hepatic abscess, general infection, or persistent diarrhea and exhaustion.

The *treatment* consists in sterilizing food and water, carefully handling excreta to prevent re-infection, having the patient rest in bed during exacerbations, prescribing tonics to improve general health, laxatives to free bowel of irritating ingesta, anodynes to relieve pain, suppositories to alleviate tenesmus, intestinal anti-

septics to minimize putrefaction, astringents to diminish frequent evacuations, and liberal doses of *ippecac* or increasing doses of *emetin* hypodermically, gr. $\frac{1}{10}$ to $\frac{1}{3}$ (0.006–0.02 cm.), to destroy entamebæ. Emetin, regarded as a specific in some quarters, relieved but failed to cure amebiasis in the majority of the author's cases.

The above therapeutic measures are not relied on to control diarrhea, destroy protozoa, or heal chronic ulcers, unless reinforced by rectocolonic, ichthyol 2, balsam of Peru 3, or boric acid 4 per cent. irrigations, and topical applications of silver nitrate 6, or



Fig. 427.—Proctosigmoidoscopic view of chronic amebic colitis showing *A*, new stellate, *B*, old irregular shaped, and *C*, extensive deep undermining mixed infection, ulcers connected by a fistula.

ichthyol 20 per cent. made through the author's speculum (Fig. 439), or a proctosigmoidoscope to sluggish lesions. The author has not found quinin an effective irrigant in this class of cases.

Entamebæ frequently become encysted, lodge beneath undermined mucosa and are difficult to destroy by lavage carried out by way of the anus, hence *appendicostomy*, *cecostomy*, or the author's valvular *enterocecostomy* elsewhere discussed is indicated to provide through-and-through colonic irrigation, heal existing lesions, and prevent reinfection.

Many of the author's patients thus operated on and treated

rapidly improved, and were cured of amebiasis after conservative measures had proved unavailing.

Bacillary Ulceration—Dysenteric.—Bacillary coloproctitis (Fig. 428) is frequently epidemic in the Philippine Islands, Japan, China, India, and some parts of Europe, and the infection is occasionally encountered in the United States among soldiers, in asylums, and camps where large numbers are segregated in unsanitary communities.

Bacillary coloproctitis has been caused by Shiga, Flexner-Harris, Kruse, Strong, Hiss and Russell, Park, Depter and Duval's dysenteric bacilli, but Shiga infection is the most virulent type. Bacillary is frequently confused with amebic coloproctitis, but the former is essentially an acute infection.



Fig. 428.—Typical ulcer above as it appeared in bacillary colitis. Note highly inflamed thickened mucosa.



Fig. 429.—Polyposis complicating chronic bacillary and mixed infectious colitis.

Manifestations are alarming from the onset, continue a few days or weeks, changes in the mucosa occur early and absorption of toxins profoundly effects nerve-centers of bladder and intestine. The infection which involves the large intestine is particularly destructive in the sigmoid flexure and rectum, and is most dangerous during the first two weeks.

Shiga bacilli attack the epithelium, causing superficial lesions, while entamebæ, which are more destructive, pass through the mucous membrane to become active in the submucosa. Extensive deep, mixed infection ulcers (Fig. 430), gangrenous sloughs, polyposis (Fig. 429), and diphtheric membranes are occasionally observed, but stenoses and liver abscesses seldom complicate bacillary colitis.

The *symptoms* of bacillary ulceration are local and constitutional, dangerous from the beginning, and more pronounced when caused by Shiga organisms. In virulent cases the patients complain of chilly sensations, intermittent temperature— 101° to 104° F., erratic weak-fast pulse—100 to 150, anorexia, thirst, hoarse voice, glazed, red tongue, cold dry skin, aching body, prostration, restlessness, headache, severe cramps, disseminated abdominal pain, colonic tenderness, nausea, vomiting, delirium, congestion of the liver, and an exhausting diarrhea characterized by small frequent stools which are feculent in the beginning, then seromucous, and finally composed almost entirely of mucus, tissue *débris*, and blood that show bright red if fresh or resembles “coffee grounds” when

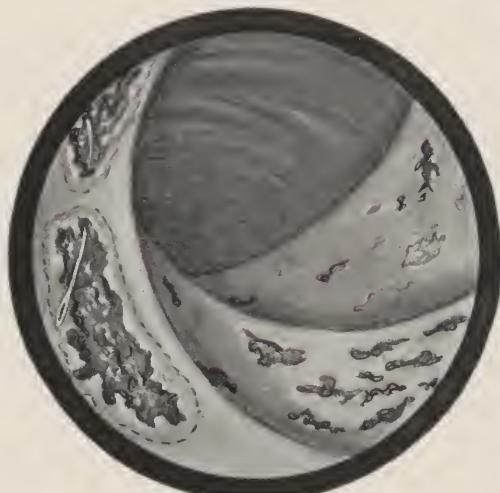


Fig. 430.—Proctoscopic view of acute, semi-acute, and late or mixed infection ulcers as they appear in chronic bacillary colitis.

retained. The tongue is furred, skin moist and relaxed, and condition of the patient shortly becomes serious, which is indicated by accompanying collapse, delirium, or coma caused by absorption of toxins, sepsis, fatigue, loss of sleep, indigestion, cramps, diarrhea, tenesmus, and loss of blood.

In favorable cases manifestations quickly or gradually subside and the patient gets well in from two to five weeks unless *acute* insidiously passes into *chronic* dysentery (colitis), from which time, owing to mixed infection, lesions and symptoms resemble those of amebic coloproctitis.

The *diagnosis* of bacillary rectocolonic ulceration is based on characteristic symptoms and finding Shiga or other dysenteric

bacilli in the stools, and pronounced improvement in the patient following the employment of sera.

Symptomatic is similar, but the curative treatment of *bacillary* differs from *amebic* ulceration, since the former quickly responds to *serotherapy*, which has no effect upon amebiasis. Prophylactic and supportive measures and rectocolonic irrigation must be reinforced by sera to be effective.

Serum is as useful in this type of infection as is antitoxin in diphtheria, but is less reliable when the patient suffers from tuberculosis or wasting disease. The dosage is regulated according to virulence of the infection, age and condition of patient, and serum is employed early, since the mortality is 30 per cent. less than when injections are delayed several days.

Irrigants and topical applications are serviceable in bacillary ulceration, but mild remedies, warm oil and bismuth, boric acid or methylene-blue enemata or irrigations, are preferable to stimulating agents like silver nitrate and ichthyol, 8 per cent., because they are more soothing and healing to the irritable mucous membrane.

The following combination ranks well for this purpose, and has worked well in the author's cases:

R. Orthoform Bismuthi subnitras	Oj 3i-3ij 3j	500 0; 4-8 0; 30 0.—M.
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Sig.—Warm, shake, and inject 2 to 6 ounces at night.

Owing to good results obtained from *serotherapy*, *surgical* intervention is seldom required in the treatment of bacillary coloproctitis, but when hygienic measures, dieting, medication, irrigation, and sera fail to control the ulcerative process, the colon is *short-circuited* or *cecostomy* or *appendicostomy* is performed to put bowel completely at rest or enable the attendant to employ through-and-through colonic medicated irrigations as required. *Colostomy* is contraindicated because of the annoyance incident to evacuations through the side and serious secondary operation necessary to close the opening.

Balantidic Ulceration.—Infection caused by *Balantidia coli* is persistent, but less common than amebic and bacillary coloproctitis. Ulceration of this type is more difficult to control than other specific infections excepting tuberculosis.

The *symptoms* of balantidic closely resemble those of amebic coloproctitis, but a *differential diagnosis* between these conditions is made by isolating *balantidia* in the feces, discharge or tissue, and examining blood for increased eosinophils.

The *treatment* for balantidic ulcers is practically the same as given above for amebic and bacillary rectocolonic ulceration.

Helminthic Ulceration.—Helminths are more often responsible for irritative than ulcerative coloproctitis, but *tape-*, *round-*, *hook-*, and *whip-worms* (Figs. 738, 750) occasionally cause erosions in the mucosa, which through mixed infection lead to the formation of macroscopic ulcers that in turn cause diarrhea and occasional hemorrhages, a condition more often encountered in children.

The *symptoms* of helminthiasis are less severe than previously described types of rectocolonic ulceration, and diarrhea is milder, but patients troubled with helminthic parasitic lesions are nervous, suffer from insomnia, complain of abdominal crawling sensations, itching at anus, persistent tenesmus, and loss of weight in spite of a ravenous appetite.

A *diagnosis* of helminthic infection is justified in the presence of above symptoms and finding of ova, worms, or their segments in the stools.

Since the author has fully discussed the treatment of helminthiasis (Chapter LXXI) it is only necessary here to mention that worms irritating the colon or rectum are satisfactorily eliminated by starvation, purging, administering specific vermicides, and repurging the patient, which is followed by astringent and other irrigations that destroy and remove helminths with their ova. When continuity of the mucosa is broken the usual topical applications are applied.

Venereal Ulceration.—Yearly the author encounters venereal lesions in the rectum at the anus, or in the perianal skin caused by syphilis, gonorrhea, or chancroids.

Syphilitic ulcers (Fig. 431) result from degenerating chancres (Fig. 431), mucous patches, papular skin eruption or condylomata, lesions fully described elsewhere.

Syphilitic anorectal ulceration promptly responds to anti-luetic and local treatment, but in neglected cases mixed infection ensues and ulcers multiply and extend until they incapacitate the patient through discomfort or exhaustion or terminate in stricture.

Luetic lesions are more pronounced in the upper rectum, which accounts for the frequency of stenoses there. Congenital anorectal syphilis manifests itself as deep, longitudinal fissures, radiating from the anus associated with erosions of skin incident to the discharge from luetic proctitis seeping through the anus.

Chancroidal ulcers (Fig. 476) are multiple, superficial; have sharply defined, irregular, inflamed, sensitive edges and bases, and secrete an abundant irritating, offensive discharge that in-

flames the skin, and show a tendency to become phagedenic when they are not kept constantly clean and properly treated.

Anal stricture more often results from chancroids than other causes, barring Whitehead's operation for hemorrhoids. The lesions may be round or oblong, but resemble fissures until the crease in skin is unfolded, and they induce prolonged sphincteric spasms and painful defecation.

Gonorrhreal ulcers are very rare, but gonorrhreal proctitis is frequently encountered and keeps the mucosa and perianal skin raw and bathed in a thick, yellowish mucopurulent discharge containing gonococci. Gonorrhreal lesions terminate in the formation of definite ulcers when mixed infection is active.



Fig. 431.—Syphilitic ulceration that involved the colon, rectum, vulvar, and perirectal regions.

Since the symptoms, diagnosis, and treatment of gonorrhreal coloproctitis has been outlined elsewhere this variety of ulceration does not require further discussion.

Strictural Ulceration.—All anorectal stenoses are caused or complicated by ulceration.

Occlusion of the rectum may be induced by non-ulcerating syphilitic and tubercular proctitis, extra-intestinal pressure, and involvement of bowel by disease in neighboring organs, and ulcers form above the block owing to resulting trauma and irritation caused by feces and the discharge.

Stercoral ulcers multiply and extend until the stricture is dilated or excised and free drainage is established.

Cancerous Ulceration.—*Sarcomata* (Fig. 584) occasionally and *carcinomata* (Fig. 577) are frequently responsible for superficial or deep ulcers in the anorectal region. Cancer of the rectum begins as a firm tumor having a broad base, and finally degenerates, forming single or multiple deep crater-like ulcers (Fig. 580) that exude a characteristic offensive discharge containing pus and blood.

Anal *epitheliomata* (Fig. 973) originate as wart like excrescences that shortly break down, or livid, irregular-shaped ulcers (Fig. 573) that attack the mucosa of the anal canal and perianal skin. *Epitheliomata* progress slowly, seldom form metastasis, cause but slight loss of weight, but eventually cause death through extensive ulceration, pain, and exhaustion.

The *pathology, symptoms, diagnosis, and treatment* of anorectal cancer have been fully discussed elsewhere.

SYMPTOMS

The manifestations of *anorectal ulceration* may be slight or severe. When lesions are few and small they cause discomfort and no systemic disturbances, but when numerous, deep, and complicated by mixed infection, abscess, or fistula they induce considerable distress or endanger life.

Ulcers may be limited to the skin, anal canal, rectum, or extend throughout the colon and cause constitutional and local disturbances.

Constitutional Symptoms.—Systemic disturbances, a loss in weight, anorexia, *indigestion*, *anemia*, sallow complexion, emaciation, impaired circulation, insomnia, malaise, and toxemia are often observed in ulcerative, catarrhal, syphilitic, tubercular, amebic, and bacillary coloproctitis with or without mixed infection ulcers.

Tubercular subjects frequently suffer from hemoptysis, severe cough, night-sweats, chest pains, and afternoon temperature; *syphilitic*, from skin eruptions, loss of hair, sore throat, mucous patches, and locomotor ataxia or paralysis, while *amebic* ulceration of the bowel is frequently complicated by hepatic abscess.

Individuals afflicted with degenerating *carcinomata* of the rectum rapidly lose weight and are cachectic. In bacillary coloproctitis high temperature, rapid, irregular pulse, extreme thirst, and muscular paralysis are observed.

Local Symptoms.—Local manifestations vary with the number, size, and location of ulcers, of which the following are the most important:

- | | |
|-------------------------|------------------------------------|
| 1. Pain. | 7. Constipation. |
| 2. Sphincteralgia. | 8. Diarrhea. |
| 3. Discharge. | 9. Tenesmus. |
| 4. Pruritus. | 10. Feeling of weight and fulness. |
| 5. Excoriation of skin. | 11. Abscess and fistula. |
| 6. Hemorrhage. | 12. Perforation and peritonitis. |

Pain.—The degree of suffering incident to anorectal ulceration depends more on the *location* than *size* of lesions. Sensibility of the rectal mucosa increases from above downward, which explains why a large ulcer in the upper rectum causes little discomfort, while a medium-sized lesion near the anus induces considerable pain.

Suffering incident to anal ulcers is attributable to abundant sensory nerve supply and squeezing of lesions by the sphincter muscles, and may be confined to rectum or extend to the sacrococcygeal, vesicle, or prostatic region, and down the limbs to continue for a short or long time depending on the degree of sphincteralgia.

Pain is burning in character if caused by acrid discharge, lancinating or tearing when due to evacuation of hardened feces, and dull when incident to prolonged sphincteric spasm.

Sphincteralgia.—Clonic and tonic spasm of the anal muscle is a frequent distressing manifestation of anal canal ulcers, and may be incited by trauma during defecation, lodgment of feces, seeds or foreign body in the lesion, instrumentation, medication, or acrid discharge.

Discharge.—At the onset of anorectal ulceration there is little mucus; later, as ulcers enlarge or multiply, mucus and pus tinted with blood is observed, and finally, in neglected cases complicated by mixed infection, the discharge is offensive, acrid, and profuse, composed of mucus, pus, blood, and tissue *débris*, constantly irritates mucosa and skin, and is responsible for burning pain in the rectum and excoriation of the integument.

Pruritus Ani.—Persistent itching of the perianal skin and lower rectum is frequently a distressing manifestation of rectal ulceration and is caused by the galling secretion, lodgment of feces, diminutive seeds, or other foreign substances in an ulcer, which is retained through sphincteric contraction. *Pruritus ani* is mitigated or prevented by frequently swabbing the anal canal free of the discharge, together with cleansing, drying, and powdering of the perianal skin.

Excoriation.—Erosions in mucosa and skin are common; they are induced by frequent irritating evacuations and acrid discharge that seeps through anus and inflames the integument.

Hemorrhage.—Bleeding, a symptom of anorectal ulceration, may be noticed as a red streak or blotch on solid feces, or blood may be slightly or abundantly mixed with semisolid or fluid evacuations. *Fresh* or bright red indicates *anal canal*, partially *congealed* points to *rectal*, and *clotted* blood (“coffee-ground” stools) suggests ulcers in upper rectum or colon.

Hemorrhage from diminutive lesions may be profuse and bleeding from large ulcers slight, depending on whether the ulcer attacks a capillary, larger vessel, or is located between arteries and veins.

Constipation.—Costiveness often complicates anal ulcers, which incite the levator ani or sphincter muscle to contract and impede passage of the feces or cause defecatory pain.



Fig. 432.—Chronic infected rectal ulcer with undermined mucosa beneath which is lodged an apple seed. To the left is a polyp having a long narrow pedicle and to the right two enlarged anal papillæ.

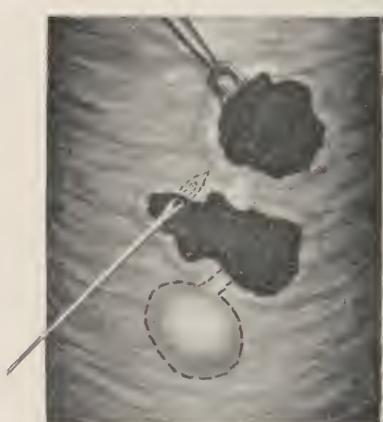


Fig. 433.—Two large ulcers separated by a bridge of undermined mucosa (fistula) indicated by probe. Below is a submucous abscess that drained through the ulcer.

Diarrhea.—Frequent soft or fluid evacuations complicate extensive catarrhal, specific, and mixed infection ulcers located in the colon, sigmoid flexure, or rectum, and the degree of diarrhea is proportionate to the *number* and *size* of lesions in which terminal nerve filaments are exposed to irritating feces and discharge. In neglected cases stools are offensive, irritating, and contain mucus, pus, blood, and tissue débris micro-organisms.

Tenesmus.—A frequent desire to stool accompanied by straining is a troublesome manifestation of anorectal ulceration, caused by burning stools and aerid discharge.

Feeling of Weight and Fulness.—These symptoms seldom com-

plicate ordinary, but are invariably present in strictural, carcinomatous, and other types of ulceration where the gut lumen is obstructed by a tumor, swelling, or impacted feces.

Abscess and Fistula.—Submucous and perianal abscesses and fistula (Fig. 433) occasionally complicate tubercular, entamebic, and other anorectal ulcers where mixed infection destroys the submucosa, leaving lodging places for the discharge, pathogenic organisms, and foreign bodies.

Perforation and Peritonitis.—Perforation (Fig. 434) followed by peritonitis is an occasional complication of tubercular, luetic, entamebic, bacillary, and carcinomatous ulcers of colon and sigmoid flexure.

Perforation of the lower rectum is rare owing to its construc-

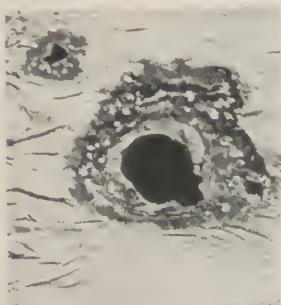


Fig. 434.—Perforating intestinal tubercular ulcer.



Fig. 435.—Composite proctoscopic view of *A*, follicular, *B*, stellate, *C*, round, *D*, irregular-shaped, deep, and *E*, superficial mixed infection ulcers as they appear in different types and degrees of chronic proctocolitis. Above is shown at *F* a large polyp attached to upper surface of a rectal valve.

tion, and when it occurs abscess and fistula ensue, but resultant peritonitis is rare, since injury is usually below the peritoneal attachment.

DIAGNOSIS

There is no excuse for not diagnosing ulcers of the anal canal, rectum, and lower sigmoid flexure, because they are easily inspected through the proctosigmoidoscope (Fig. 435) when high, and can be seen through the author's anoscope or speculum or be detected by digital examination when low.

A *tubular* instrument is far superior to the *speculum* because it affords a better view and its manipulation is less painful.

Patients complaining of diarrhea, pus, blood and mucus in the stool, and tenesmus should be suspected of having fully devel-

oped ulcers in the colon, sigmoid, or *movable rectum*, but when the patient notices mucus, pus, or blood in the feces and is distressed by constipation, painful defecation, sphincteralgia, and pruritus ani one is justified in suspecting ulcers in the *anal canal*. Superficial and deep lesions are readily detected with the educated finger, but frequently remain undiscovered when the examiner is inexperienced or wears a glove.

Ulceration is *extensive* (Fig. 423) when the patient loses considerable weight, exhibits manifestations of absorption, suffers from chronic diarrhea, pelvic tenderness or cramps, and stools contain an abundance of pus, blood, and mucus, and *slight* when

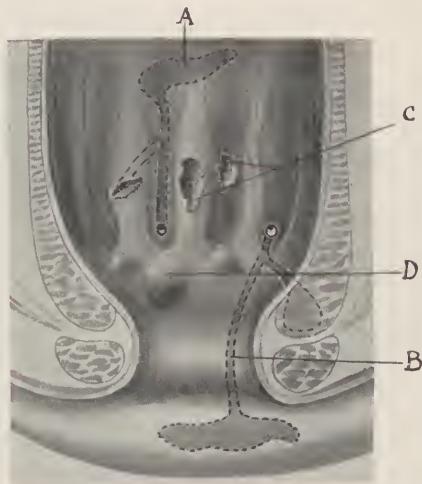


Fig. 436.—Multiple rectal ulcers that led to infection and formation of abscesses and fistulæ: A, Blind submucous fistula opening in a crypt; B, abscess and blind fistula tracking downward beneath mucosa and skin; C, ulcers; D, hypertrophied anal papillæ.

these manifestations are absent and the sufferer complains of painful evacuations, pruritus, sphincteralgia, and blood streaks upon the fecal bolus.

Often it is impossible to base an etiologic diagnosis upon appearance of lesions or sensation derived by the touch.

In doubtful cases microscopic examination of the excrement, discharge, and tissue débris is essential because it is the only means by which *tubercle bacilli*, *Shiga* organisms, *Entamœba histolytica*, *gonococci*, segments of *helminths* or their ova, etc., can be discovered and character of the infection ascertained.

Ulcers the specific nature of which cannot be demonstrated are diagnosed as *catarrhal* unless *traumatic*. The author does not

consider *follicular* (Fig. 435) as a distinct etiologic type of ulceration, because the inflammation, swelling, and degeneration of follicles with overlying epithelium occurs in all forms of rectocolonic inflammation leading to ulceration.

Hemorrhoidal are readily detected upon pile tumors, and *varicose* ulcers (Figs. 312, 411) are recognized as sluggish lesions lying between or connected with enlarged vermicular-like veins observed on all sides of the rectum. *Cutaneous*, *verrucose*, *lupoid*, *diphtheric*, *gangrenous*, *phagedenic*, and other rare forms of ulceration and esthiomène have been individually described elsewhere and are not of sufficient importance to require further discussion here.

Uncomplicated cases of *strictural* and *carcinomatous* ulceration are easily diagnosed; the former by the accompanying stenosis, and the latter by large, firm, protuberant masses found in the rectum, characterized by deep, crater-like ulcers, and a discharge possessing an offensive cancerous odor.

Anal epithelioma and *rectal tuberculosis* are accompanied by marked destruction of tissue in the lower anal canal and perianal region.

Rodent lesions resemble epitheliomatous, but require a longer time to accomplish the same degree of destruction. *Chancroids* are differentiated by multiplicity of the lesions, sharply defined sensitive serrated edges, fissure-like appearance, tendency to phagedenic changes, and accompanying intense pain and sphincteralgia.

Chancres here resemble similar lesions elsewhere, and there is little difficulty in diagnosing *mucous patches* which simulate those of the mouth. When in doubt as to luetic nature of the lesion the diagnosis is cleared by obtaining a comprehensive history, treating stigmata, performing the Wassermann test, and prescribing antisyphilitic remedies.

TREATMENT

Therapeutic measures required in cases of anorectal ulceration are varied, depending on the cause of the lesions, constitutional and local complications, whether or not colon and sigmoid are involved, and number, size, and location of ulcers. The treatment may be *constitutional*, *local*, or *combined*.

Constitutional Treatment.—Ulcers of the lower rectum when few and superficial induce *local*, but when lesions are numerous, extensive, and scattered throughout the rectum, sigmoid flexure, and colon, they are responsible for distressing *systemic* disturbances. Tubercular, amebic, bacillary, syphilitic, balantidic, or catarrhal

ulcerative coloproctitis—plus mixed infection—is usually responsible for the ulcerative process in serious cases.

When the patient has lost considerable weight, is anemic, nervous, and troubled with digestive disturbance, insomnia, and abdominal cramps, he should forego business and social duties, rest at home or in bed in an airy room amid pleasant surroundings, and receive *supportive* treatment including non-irritating, nourishing, easily digested food, blood and nerve tonics, anti-diarrheal medication, opiates for pain, hypnotics to induce sleep, castor oil, calomel, or other laxatives to evacuate retained irritating feces, discharge, toxins, and bacteria, and salol or other intestinal antiseptics when indicated.

The above measures are reinforced by tuberculin when the subject is tubercular, salvarsan or mixed treatment when luetic, injection of autogenous serum when infection is caused by Shiga or other dysenteric bacilli, and starvation, vermifuges, and catharsis when ulceration and diarrhea are caused by helminths.

Regulation of the Stool.—*Fluid*, *firm*, or *nodular* evacuations aggravate rectal and anal ulcers, the former through irritating and infecting, and the latter by traumatizing lesions, consequently antidiarrheal remedies are indicated in some and laxatives in other cases. Best results follow when daily semisolid evacuations are obtained.

Local Treatment.—The direct treatment of rectocolonic and anal ulcers is *conservative*, *surgical*, or either, combined with general therapeutic measures. Persistent lesions not improved by dieting, rest, and internal medication usually respond promptly to individual treatment or operation and topical applications.

Conservative Treatment.—Irrigation, oil injections, sprays, insufflation of powders, topical applications, cauterants, suppositories, and medicated tampons alone or in combination are useful in the conservative treatment of rectocolonic, anal, and perianal ulceration.

High ulcers are not sensitive, but lesions in the lower rectum and perianal skin which are should be anesthetized to prevent immediate and after-pain, and forestall sphincteric spasm caused by instrumentation or treating diseased areas. The parts may be desensitized with cocaine or eucain, 10 per cent., used in a spray or on cotton, or dusting ulcers with orthoform or analgin which are also useful in the form of powders, ointments, and suppositories. When a lesion is to be incised, curedted (Fig. 442), or cauterized a few drops of eucain, $\frac{1}{8}$ per cent. solution, is injected beneath its base, which renders the procedure painless.

Irrigation.—Medicated lavage (Fig. 437) is effective in the treatment of ulceration wherever located, but is more often employed for colonic and sigmoidal than rectal ulcers because the latter can be individually treated through the proctoscope or author's anoscope. The large intestine may be satisfactorily irrigated through a single- or double-flow tube or irrigator (Fig. 472) with the patient in the Sims or recumbent posture with hips raised.

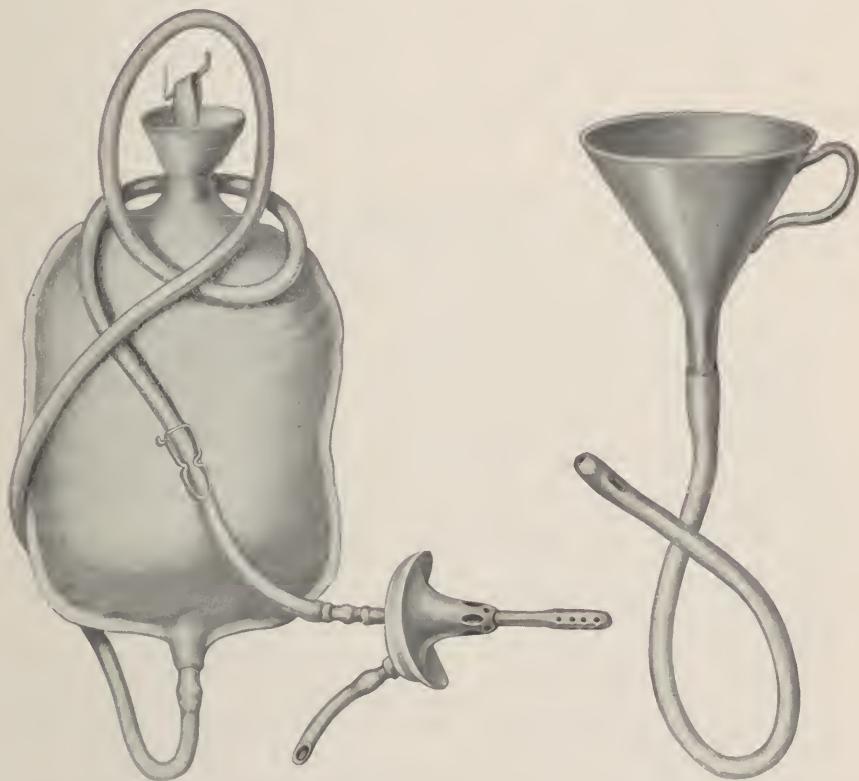


Fig. 437.—Fountain syringe with return-flow irrigating attachment. Employed in the irrigating treatment of rectal ulcers.

Fig. 438.—Funnel and tube, useful for administering oil emulsions and medicated enemas in the treatment of rectal ulceration.

To be effective the solution must reach all lesions, which is best accomplished through massage and changing the patient's posture during the irrigation. Many irrigants are employed in the treatment of ulcerative coloproctitis, but ichthylol 2, balsam of Peru 2, boric acid 4 per cent., are the most useful. Normal saline or Carlsbad salt irrigations are serviceable when the bowel is in-

flamed or dotted with diminutive erosions, and a few silver nitrate, gr. x to Oij, irrigations are employed when ulcers are numerous, extensive, bleed freely, and cause exhausting diarrhea.

When flushing is unsatisfactory because the irrigation cannot be made to reach all segments of the diseased bowel *appendicostomy*, *cecostomy*, or the author's *valvular enterocecostomy* is necessary to insure through-and-through rectocolonic lavage. Ulcers rapidly heal and diarrhea subsides quickly when lesions are daily cleansed of irritating feces, micro-organisms, toxins, and discharge.

Oil Injection.—Emulsions (Fig. 438) containing bismuth and other soothing or astringent agents are healing, and diminish intestinal irritability when projected warm. Excellent results in aggravated cases of rectocolonic ulceration are obtained by alternating medicated irrigations and emulsions. The accompanying formula has proved universally satisfactory in the treatment of inflammatory and ulcerative lesions located in the colon and rectum:

R. Bismuthi subnitras.....	3ss	15|0;
Thymolis iodidum.....	3j	4|0;
Oleum olivæ.....	q.s. ad. Oj	500|0.

M. ft. emulsion.

Sig.—Heat, shake, and inject 30.0 into the colon through a soft-rubber tube.

Spray.—With the aid of sigmoidoscope or proctoscope, inflammatory and ulcerative lesions in the rectum and sigmoid can be sprayed to advantage (Fig. 441). Such treatments are quickly made, pleasing to the patient, and helpful when a boric acid 2, salicylic acid $\frac{1}{4}$, silver nitrate $\frac{1}{2}$, or Carlsbad salts 1 per cent. solution is used alone or in combination with albolic, eucalyptol, menthol, thymol, or aromatics.

Insufflation is useful in all types of proctitis with or without erosions, but is not effective in the treatment of large, deep lesions because powder accumulates and cakes in them, causing irritation.

The sigmoid and rectum is readily treated by insufflation with patient in knee-chest posture through a small proctoscope. Properly mixed powders are healing, deodorize the discharge, soothe the irritable mucosa, diminish bleeding, and minimize pain. Boric acid in combination with astringents, styptics, or analgesics insufflated into the bowel three times weekly has given satisfaction, and bismuth carbonate or gallate, salicylic acid are reliable substitutes.

The accompanying powder, which is valuable because of its antiseptic, healing, and analgesic properties is easy to insufflate owing to its lightness:

R.	Cocainæ hydrochloridum.....	gr. xij	0|8;
	Hydrargyri chloridum mite.....	3ss	20;
	Zinci stearas	{ 3ss	
	Talcum purificatum }	3ss	150.—M.

Sig.—Insufflate daily or every other day through a proctoscope or anoscope.

When there are bleeding ulcers and a stronger powder is required the following acts nicely:

R.	Acidum tannicum.....	3ss	20;
	Bismuthi salicylas.....	gr. xx	13;
	Pulv. alumem.....	3ss	20;
	Pulv. talcum.....	q.s. ad. 3j	300.—M.

Sig.—Insufflate every other day.

Occasionally it is advisable to alternate insufflation with irrigation or topical applications.



Fig. 439.—Ulcer being treated by topical application made through the author's speculum.

Topical Applications.—Often irrigating, spraying, and insufflating prove insufficient and topical applications made to individual lesions in the sigmoid, rectum, or anal canal (Fig. 439) hasten healing. When ulcers are numerous and scattered time is not to be lost in isolating lesions, because with the aid of the author's long forceps, having bent handles to prevent obstructing

the view, the bowel is quickly swabbed through a short or long tubular instrument.

Lesions in the lower rectum or anal canal are treated through a small proctoscope or anoscope—in preference to the speculum—following application or spraying with eucain, since lesions near anus are extremely sensitive. Some ulcers respond to *stimulating* and others to *sedative* applications, or alternate treatment. Strong agents are seldom required and in the author's hands the following drugs have proved efficacious—silver nitrate 6, ichthyol and glycerin 10, balsam of Peru and castor oil 25, argyrol 25 per cent. when applied directly to ulcers on a cotton applicator or saturated gauze strip left *in situ*, which keeps its medicament constantly in



Fig. 440.—Cauterizing ulcers through a proctoscope with a Paquelin cautery.

contact with lesions and acts as a drain. Full strength lactic acid acts well when applied to ulcerated areas constantly bathed in pus.

When ulcers are irritable, methylene-blue, 10 per cent., is substituted for stimulating agents because of its antiseptic, sedative, and healing qualities.

Styptic agents—adrenalin, thromboplastin, iron, tannic acid, and alum—alone or in combination occasionally minimize bleeding, and stimulate healing.

Cauterants.—Caustics and corrosives—lactic, nitric, and carbolic acid, zinc chlorid, copper sulphate, and stick silver—are contraindicated in the treatment of anorectal ulcers, since their application is extremely painful, often followed by sloughing, causes

sphincteric spasms, and delays healing by enlarging and deepening denuded area. The author has treated many patients for extensive burns and strictures induced by these agents.

Cauterization and Fulguration.—Physicians employ an electric or Paquelin (Fig. 440) cautery more often than is necessary in the treatment of anorectal ulcers. Burning in most cases does more harm than good, and adds greatly to the patient's suffering. Occasionally one is justified in destroying unhealthy granulations and overhanging edges of mucosa or skin to facilitate drainage and hasten a cure, but under these circumstances high-frequency *fulguration* (Fig. 441) is preferable to the actual cautery because it is less painful and does not produce cicatricial tissue.



Fig. 441.—Convenient position for the patient and method of treating ulcers through an anoscope by fulguration with high-frequency spark.

Suppositories.—Medication in the form of suppositories is not always desirable because their introduction is painful and may irritate ulcers, but their employment is justified when post-defecatory pain is severe or sphincteralgia is distressing. To relieve discomfort and tenesmus incident to anal canal ulceration the following suppository invariably brings relief:

R.	Morphinæ sulphas Cocainæ hydrochloridum Ext. belladonnae Oleum thebromatis	.....	ææ gr. $\frac{1}{8}$	0	008.
Ft. suppository.			q.s. ad.—M.		

Sig.—Insert one, and repeat in three hours if necessary.

Tampons of cotton or gauze, moistened or dusted with styptics, stimulating or astringent drugs are occasionally resorted to in the treatment of large, sluggish or bleeding anorectal ulcers where it is necessary to exert pressure, control bleeding, or stimulate healing when less radical measures have failed.

Surgical Treatment.—Operative measures are seldom required in acute, but often indicated in the treatment of chronic anorectal and colonic ulcers complicated by mixed infection—procedures that may be grouped as *anal*, *rectal*, and *abdominal*—of which the former are performed under *local*, and the two last named are operated under general anesthesia.



Fig. 442.—Curetting an ulcer in the lower rectum through the author's anoscope.

Indolent ulcers sometimes heal rapidly following *curettage* (Fig. 442) and *trimming* off of overhanging mucosa or skin edges that retain secretions.

Sphincteric spasm frequently complicates ulcers about the anus and is responsible for intense pain, imperfect drainage, and traumatizing of lesions. In such cases forcible *divulsion* or *incision* of the anal muscle as in fissure operations under eucain anesthesia immediately relieves suffering and hastens a cure.

The author prefers division to stretching the sphincter because following the latter the muscle regains its tonicity and causes further trouble before ulcers have healed.

Some surgeons *excise* lesions and suture the wound (Fig. 443, left), an undesirable procedure because it is more difficult, and frequently followed by infection and abscess unless drainage is provided for (Fig. 443, right).

When ulcers are deep and infected the author *splits* them and the sphincters (Fig. 199) to insure drainage, and in aggravated cases of multiple ulcers with intercommunicating fistulæ rectal sinuses are *incised* and made to communicate with the main cut.

In 3 cases of deep mixed infection ulcers (Fig. 443) involving the anal canal cures were accomplished by excising mucosa of the lower rectum as shown in the accompanying illustration (Fig. 443).

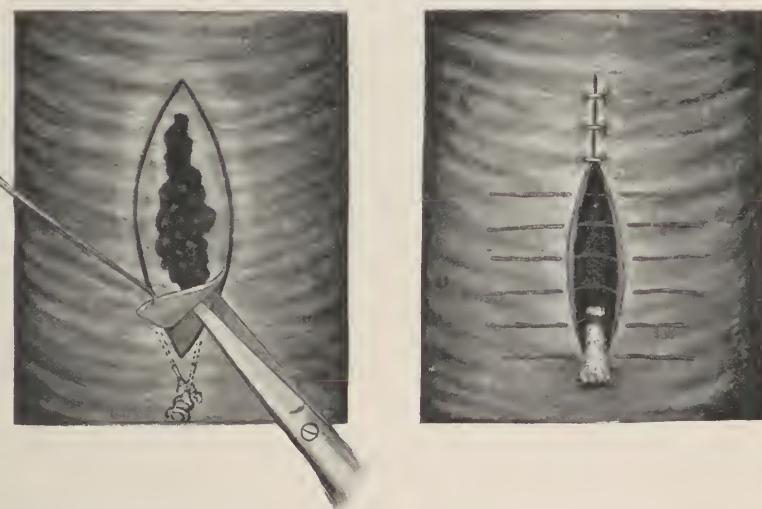


Fig. 443.—Simple method of excising an ulcer in the lower rectum under local anesthesia.

In deplorable cases of malignant, specific, or mixed infection ulcers that have destroyed large areas of or riddled the bowel, *colostomy* (Fig. 445) is performed that the rectum may be put at rest and cleansed by irrigation introduced from above and below.

Under such circumstances when the patient declines an artificial anus the diseased gut is *extirpated* by *perineal*, *vaginal*, or *superior proctectomy* after the plans elsewhere described and illustrated.

Appendicostomy, *cecostomy*, and the author's *valvular enterocecostomy* (Fig. 993) are preferable to *colostomy* in catarrhal and infectious ulcerative coloproctitis, because they provide for through-and-through colonic irrigation and avoid the disgusting features of an artificial anus.

The author's *valvular ileocecostomy* is indicated when the

ileum is also ulcerated, because following the operation both colon and small bowel can be separately or simultaneously irrigated.

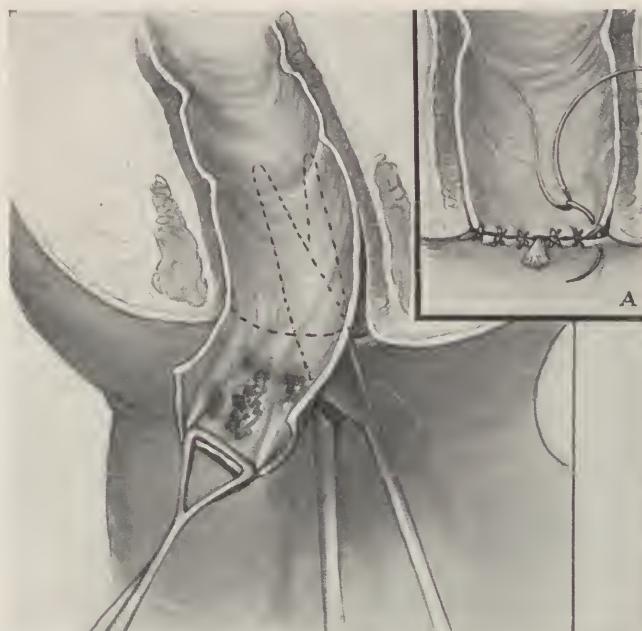


Fig. 444.—Author's method of freeing mucosa of the anal canal and excising chronic ulcers: Insert A shows the mucosa and skin approximated with interrupted catgut sutures and drain inserted.

Deplorable cases of rectocolonic ulceration are sometimes complicated by *papillomata*, and when these growths or polyps are numerous and scattered throughout the large intestine

ileostomy, colonic exclusion, which puts the bowel at rest, combined with *appendicostomy* or *cecostomy*, which insures drainage and enables one to effectively irrigate the colon, gives universally good results.



Fig. 445.—Appearance of colostomy wound two weeks after operation made to relieve polyposis, extensive sloughing, and deep burrowing ulcers involving the sigmoid flexure and rectum in a case of chronic bacillary colitis.

Large or small polyps in the rectum are ligated and excised if within reach, but when located in the upper rectum or lower sigmoid they are destroyed by

fulguration or removed through pressure necrosis by attaching Gant's rectal valve-clamp to their pedicles.

Chapter XXXIX

Pruritus Ani, Scroti, and Vulvæ

Clinical Definition.—Pruritus ani—often falsely designated itching piles—is characterized by persistent, intense itching in the anogluteal region, moisture, maceration or excoriation of the parts, and thickened, indurated, parchment-like, radiating perianal skin folds.

Typical cases of pruritus cause great distress, and the condition requires more patience and ingenuity to diagnose and successfully treat than any other affection with which the proctologist has to contend.

Itching at the anus is common to all ages, climates, races, vocations, walks of life, and social strata, but is encountered most frequently in fat and persons who follow sedentary occupations. The favored age is from thirty to fifty years, but pruritus ani is occasionally met with in senile men and women and children suffering from thread-worms.

Pruritus ani attacks men with greater frequency than women, the ratio being about 60 to 40, and for some unaccountable reason robust, healthy persons are more prone to it than anemic, tubercular, and run-down individuals, barring those afflicted with diabetes, rheumatism, or gout.

The well-to-do class who overfeed, consume highly seasoned foods, dissipate, and drink freely of alcoholic beverages are victims of pruritus to a greater degree than poor people and laborers in the field except when they are unclean or perspire excessively, and blondes who have a delicate skin are more apt to suffer from the condition than phlegmatic brunettes. Many physicians look upon pruritus as a neurosis, but it is seldom associated with hysteria, neurasthenia, or other neurogenic disturbances or affections.

Undoubtedly many sufferers are nervous, but this can be accounted for by loss of sleep and anxiety over their inability to obtain relief from tormenting itching.

Doctors are inclined to belittle the manifestation, but from the patient's view itching from which he suffers dominates his troubles.

Pruritus ordinarily is a manifestation—*symptomatic pruritus*—of local or constitutional disease, but may be induced by foreign bodies, pessaries, uncleanliness, drug taking, heat, violent exercise,

excessive perspiration, irritation incident to lice, rubbing of clothing, pederasty, rectal onanism, and application of drugs—particularly rancid ointment.

When the disease or condition *originating* the trouble has been eliminated, the patient's distress is often relieved, but itching of the perianal skin sometimes persists in a modified or exaggerated form for weeks, months, or years after the *primary* etiologic factor responsible for it has been relieved or cured. Because of this the importance ascribed to itching by the patient, and frequency with which pruritus is mitigated or cured by remedies directed against itching areas, it seems one might be pardoned for designating the ailment as an affection, *per se*, *pruritus ani essentialis*, a disease lacking pathology, or an effect without a cause.

Individuals having acquired or inherited neurogenic tendencies who contract itching at the anus suffer greater annoyance than others.

The distress incident to pruritus analis is slight in some and unbearable in other cases, and the itching may be *paroxysmal*, *interrupted*, or *continuous*.

ETIOLOGY

During the past decade proctologists have centralized their attention on pruritus ani, with the object of ascertaining the cause or factors behind this distressing ailment, but in spite of prodigious efforts the etiology of a large percentage of cases still remains in doubt.

While it is claimed this or that induces chronic anal itching, no one can point with assurance to any single cause that brings on pruritus in a series of cases. A close study of the subject indicates that the etiologic factors in pruritus under different circumstances are many and varied—poikilogenic.

That the reader may derive some idea regarding the relation of *cause* and *effect* the author has *grouped* the local and general diseases and conditions said to have caused or aggravated pruritus ani.

Systemic Causes.—Diabetes, obstructive liver and heart lesions, constipation and auto-intoxication, gout, rheumatism, lithemia, nephritis, tuberculosis, syphilis, malaria, vasomotor disturbances, and unbalanced internal secretions have at different times been associated with or caused persistent itching of the perianal, vulvar, or scrotal regions.

The author has more frequently encountered diabetes and portal obstruction in connection with anal pruritus than other

constitutional disturbances, but while the treatment of these conditions tended to relieve itching elsewhere, in no instance did it completely eradicate anal pruritus except when employed in conjunction with local topical applications or operations.

Psychic, Neurogenic, and Reflex Causes.—Perianal itching is invariably intensified by *psychic disturbances*—such as business worries, sorrow, fright, and shock—but psychic pruritus is usually encountered in individuals who are possessed of a delusion that they are unclean, wear poisoned clothing, are covered with lice, or suffer from an anorectal venereal disease when such is not the case, and who, as a result, sometimes extensively lacerate themselves through scratching in their endeavors to obtain relief.

Perianal neuritis is occasionally complicated by troublesome itching.

Neurasthenic, hysterical, and otherwise neurotic persons who permit their mind to constantly dwell on real or imaginary afflictions complain greatly of pruritus once their attention has been directed to itching at the anus the result of local, neurogenic, or systemic ailments.

Persistent itching in the rectum or perianal skin is often a *reflex* manifestation of prostatic enlargement, cancer, vesical calculi, urethral or rectal stricture, seminal vesiculitis, varicocele, phimosis, pelvic tumors, floating kidney, uterine displacement, vaginitis, and continues until they are relieved or cured.

Dietary Causes.—Lazy individuals who live an irregular life, constantly overfeed, and consume rich food plastered with condiments are frequent sufferers from itching of the skin, particularly in the perianal region, because their manner of living is conducive to circulatory engorgement, and sensitive, congested mucosa that secretes an overabundance of mucus which seeps out and irritates the integument.

Lobsters, crabs, snails, scallops, oysters, clams, and certain fish frequently cause general or local itching if eaten unsound or often in liberal amounts, for they possess a toxin that is annoying or dangerous to individuals having an idiosyncrasy for it.

Pruritus, skin, gastro-intestinal, and other disturbances are occasionally caused by tomatoes, strawberries, oatmeal, buckwheat cakes, and other foods not harmful to the average individual.

Mechanical and Irritative Causes.—Fecal impaction, hemorrhoids, hypertrophied prostate, uterine enlargement, retroversion or procidentia, vaginal pessaries and stricture or tumors of the rectum, bladder, or pelvis are classed among the *mechanical causes* of pruritus ani, since they press upon local nerves or lead to venous

engorgement of the lower rectum and perianal skin by obstructing blood-vessels.

Irritative pruritus is occasionally traceable to uncleanliness, catarrhal and infectious anorectal, vaginal, uterine, and urethral discharges, abnormal secretion of the sudorific and sebaceous glands, cryptitis, papillitis, iodoform poisoning, sitting on leather or plush seats during tedious railway journeys, rough and printed toilet paper, using alkali soaps, employing sure-cure pile remedies, mosquito bites, walking, riding, driving, rowing, hairs caught in the anus, shaving the buttocks preparatory to surgical operations, and lodging of fecoliths, seeds, or foreign bodies in crypts and mucocutaneous folds.



Fig. 446.—Pruritus ani incited by thread-worms—*Oxyuris vermicularis*—located in mucocutaneous folds of the anus.

Parasitic Causes.—Children and young adults often suffer from itching at and above the anus incident to *Oxyuris vermicularis*—thread-worms—concealed within folds of the mucosa and perianal skin (Fig. 446).

Recently the author treated a young child thus annoyed, one of a family of 6 children, all of whom suffered severely from pruritus ani caused by these parasites, which are always difficult to eradicate.

Several times *Ascarides lumbricoides* (round-) and *Tænia saginata* (tape-) worms, whole or in segments, were observed to produce wriggling or itching sensations in the rectum or anal canal, pediculi

located in hairy regions adjacent to the anus have occasionally caused perianal itching; strongyloides and other parasites have in rare instances been associated with pruritus ani.

Dermatologic Causes.—Pruritus and perianal skin affections are often confused and mistakenly treated the one for the other. Eczema marginatum, erythema, urticaria, scabies, herpes, ringworm, infected hair-follicles, and neurodermatitis (nodular prurigo) are the skin affections believed to have most frequently caused or been associated with distressing itching at and in close proximity to the anus.

Medicinal and Chemical Causes.—Medicines, such as quinin, cocaine, opiates, arsenic, belladonna, salicylate of soda, copaiba, and iodid preparations, taken internally for a considerable time occasionally induce unbearable itching confined to the buttocks or involves the skin over the entire body; and chemicals in the form of lotions, powders, and ointments employed by the laity in the treatment of piles, fissure, and fistula frequently cause annoying pruritus ani.

Local Causes.—Affections of the colon, rectum, anus, uterus, vagina, urethra and pelvis, directly or indirectly responsible for hypersecretion of mucous or acrid discharges that intermittently or constantly irritate the rectal mucous membrane or perianal skin are frequent and important factors in anovulvar pruritus.

Persistent itching from this source is frequently caused by catarrhal or infectious (entamebic, bacillary, tubercular, syphilitic, balantidic, coccitic, flagellate, and helminthic) ulcerative colitis or proctitis, fistula, fissure, procidentia recti, polyps, stricture, carcinoma, abscess, cryptitis, ulcerated hemorrhoids, hypertrophied papillæ, encysted fecoliths, foreign bodies (tubercular or luetic), primary and late lesions, irritable sphincter, uterine and vaginal diseases (leukorrhea, gonorrhea).

Miscellaneous Causes.—In this category belongs chronic alcoholism, morphinism, cocaineism, excessive smoking, climatic and vocational influences, pregnancy, and variance in osmotic pressure of different tegumentary layers.

Postoperative Causes.—Troublesome itching in the anorectal region is occasionally induced by operations followed by the formation of scar tissue that entangles sensory nerves, obstructs local vessels, causing venous congestion, or that leaves chronic pus-secreting wounds.

Whitehead's hemorrhoidal operation (Figs. 354, 356) is often responsible for aggravated pruritus because it leaves the patient with a stricture, anorectal ulceration, proctitis, or fecal inconti-

nence complicated by a mucous or acrid discharge that seeps through the anus and constantly keeps the skin irritated, inflamed, or excoriated, or leaves nerves (local) constricted by cicatricial tissue.

Senile Causes.—Old age is a common etiologic factor, and pruritus is common and persistent in the *anovulvar* and scrotal regions of old women and men. Senility impairs nerve function, diminishes blood-supply to the skin, and favors constipation and fecal impaction, known causes of pruritus ani.



Fig. 447.—Slightly enlarged anal papillæ that caused annoying pruritus through tickling the anus.

Streptococcic Infection.—Investigations of Murray, Hirschman, Kiger, the author, and others indicate that pruritus ani sometimes results from infection of the perianal skin caused by *streptococci*, of which the *S. fecalis* is the dominant organism.

If this type of infection is responsible for most cases of obstinate pruritus ani, as claimed by Murray, it is remarkable that every one does not suffer from itching here because the *fecalis* and other

types of streptococci are nearly always discoverable in skin adjacent to the anus in healthy and individuals suffering from pruritus ani.

Since these organisms are ever present in the mucosa and integument of the anal region it is difficult to understand how a permanent cure can be brought about through the employment of autogenous streptococcus (*fecalis*) vaccine, since there is nothing to prevent continuance of the old or starting of a new infection after the beneficent action of the virus has spent itself, unless vaccine is reinforced by other treatment that continuously renders the organisms harmless.

It is doubtful if a lasting immunity against the *Streptococcus fecalis* is produced by vaccines, for the author has several times known pruritus to recur weeks, months, or years after it had been relieved by serum treatment.

The most favorable results obtained by the author from vaccine injections have been in cases of pruritus where the skin was devoid of lesions, and there was no disease in the anorectal region to account for persistent itching. This would indicate there are other and more important etiologic factors in pruritus ani than infection caused by organisms of the streptococcal group, and it does not follow that because lesions are not found that they do or have not existed and previously instigated pruritus.

Jamison maintains pruritus is caused by channels (Fig. 281) running beneath the mucosa and perianal skin that are secondary to proctitis, and that these tracts contain mucus. The author has frequently observed subcutaneous and submucous sinuses containing serum, a mucous discharge, or pus associated with pruritus analis, but has not encountered so-called "mucous channels," but when present they are slit open and drained.

Owing to the varied etiology of perianal itching each case of pruritus should be thoroughly and separately studied to ascertain what is inducing the annoyance, and determine if pruritus results from single or multiple causes.

Sometimes in distressing cases the mucosa and integument are normal in appearance, and a painstaking examination of adjacent and distant structures is necessary to determine the source of the itching, which is sometimes impossible.

PATHOLOGY

Physical Characteristics.—Appearance of the integument about the anus in pruritic cases varies, depending on what causes the itching, duration of the manifestation, and degree of inflammation,

excoriation, or maceration of the parts incident to scratching or action of acrid anorectal secretions.

Pruritus analis has in the majority of the author's cases apparently resulted from remittent or continuous bathing of the lower rectum and perianal skin with mucus or an irritating discharge variable in character, according to its origin and time it has been retained in the bowel.

Under such circumstances parts about the anus are moist in spots or over extensive areas, sometimes including the scrotal, sacrococcygeal, and vulvar regions. Occasionally the secretion comes from overactive sebaceous glands or hair-follicles, but at other times the integument is soaked for days by a thin, eczematous-like discharge that exudes from the skin without apparent cause, and in such cases the anal canal remains dry.

Irritating discharges responsible for pruritus ani are most frequently a complication of catarrhal or specific coloproctitis, procidentia recti, hemorrhoids, cancer, polyps, ulceration, fistula, fissure or inflamed crypts, and continue until lesions responsible for them have been removed.

Itching from foreign bodies and anal papillæ (Fig. 447) is confined chiefly to the lower anal canal, moisture not always being a symptom.

Pruritus analis occasionally complicates atrophic or dry proctitis, when mucosa and skin are fragile and crack easily if distended or pulled upon.

Usually, where itching has been traced to *Streptococcus fecalis* infection, abundant moisture of the perianal skin has been observed.

From what has been said it may be inferred that *moisture of the parts* the result of internal or external secretion is the *pathognomonic* or characteristic sign of pruritus ani, and the author believes it is chiefly responsible for itching in 90 per cent. of the cases, however produced (Fig. 448, left).

When *fresh*, some perianal discharges are *slightly* and others *markedly* irritating, but all secretions permitted to remain on the mucosa or skin and decompose become rancid and acrid, and sooner or later lead to *acute*, *subacute*, or *chronic dermatitis* and changes beneath the integument—subcutaneous adhesions (Fig. 449).

Acute inflammation of superficial and deep skin layers accompanied by intense itching, burning, and stinging pain is usually a complication of a suddenly appearing disturbance in the rectum, vagina, or buttocks, such as fissure, abscess, fistula, cryptitis, gonorrhea, or uterine discharge, and promptly subsides when the affection responsible for it has been relieved or cured.

In typical cases of pruritus analis the patient has a chronic dermatitis of the perianal region that leads to progressive characteristic changes in the skin. Early in the inflammatory process the integument is slightly congested, reddened, swollen, and sometimes edematous—the result of scratching and the biting discharge; but gradually inflammation becomes *subacute* or *chronic* and the skin becomes thickened, thrown into radiating folds (with deep crevices between) (Fig. 349, A), and assumes a glistening pearl or whitish color (Fig. 349).

When irritation from the discharge and lacerations incidental to scratching or rubbing of clothing continues for months or years the integument becomes very thick, leathery (elephant skin), and parchment-like (Fig. 349).

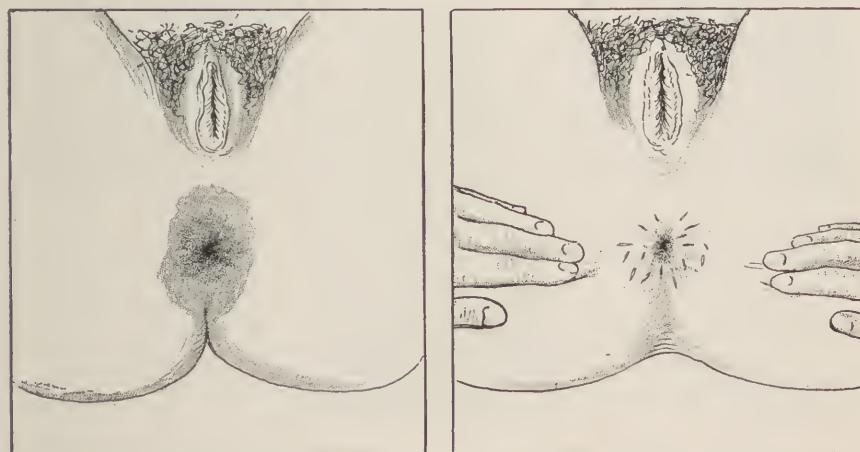


Fig. 448.—Pruritus ani. Left: Excoriation of mucosa and skin induced by seepage of a mucopurulent discharge through the anus. Right: Skin markings due to scratching.

Under such circumstances itching is intolerable, and heavy scratching (Fig. 448, right) does not bring relief, though it traumatizes and distorts the parts.

Usually the chronic inflammatory process involves the skin and structures beneath, which through increased formation of connective tissue causes them to atrophy, a hardening process that *ensnares sensory nerves and constricts capillary vessels*.

A microscopic examination of the integument removed from a patient suffering from aggravated pruritus ani showed a slowly progressive subcutaneous *fibrosis* mainly affecting nerves and their terminal filaments, some of which were tightly compressed or destroyed.

Isolated or entangled terminal nerve filaments are hypersensitive and cause tantalizing itching upon slight provocation, and pruritus ani continues until the nerve endings have been freed by operation (Figs. 453, 454) or local treatment that eliminates irritation and inflammatory changes.

Dead white, thickened, immobile skin and radiating rigid rugae may be confined to a small area at the side or extend entirely around the anus (Fig. 449), sometimes reaching to the sacrum, vagina, or scrotum.

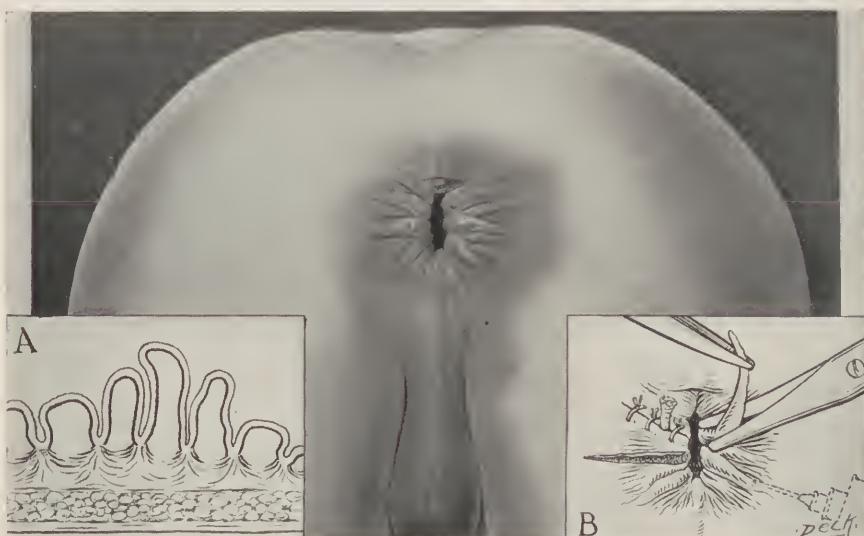


Fig. 449.—Aggravated case of pruritus ani showing numerous hypertrophied anal skin folds and intervening crevices: *A*, Subcutaneous adhesions at the base of thickened skin folds; *B*, technic of excising hypertrophied tegumentary ridges under local anesthesia. On the left is shown the method of draining and closing the wound.

Usually itching is most intense at the perineal raphé and transverse postanal skin folds, which stand out as raised, thickened, pearl-white ridges.

In deplorable cases of pruritus ani deep crevices lying between long, thickened, elevated, radiating skin folds (Fig. 449) are partly or entirely caused by *subtegumentary adhesions* that draw the skin inward (Fig. 449, *A*) proportionally as contraction of fibrous tissue takes place. This is easily demonstrated by dissecting the skin from its attachment, which is immediately followed by straightening of the integument, disappearance of ridges and seams, and cessation of itching.

Depigmentation or white parchment-like appearance of the

skin is caused by the absorption of coloring matter, desquamation from scratching, and impairment to the circulation due to constriction or blocking of the terminal vessels.

Occasionally perianal depigmentation due to alteration in local nerve supply has been associated with leukoderma, and coloring matter has been made to disappear through the formation of exudates that separated the epidermis from its attachment and destroyed the rete malpighii or pigmentary layer of the skin.

Sometimes perianal glands atrophy, follicles are destroyed, and hairs disappear as a result of the inflammatory process and trauma; and sometimes large or small, whitish or stained detachable scales form upon the rugæ or between crevices separating them.

In aggravated cases of pruritus the mucosa is slack, thickened and fissured, or thrown into indurated folds, under which circumstances the sphincter muscle is irritable or hypertrophied.

Where pruritus analis is caused by or associated with a *dermatologic* affection the skin shows the usual markings of eczema marginatum, ringworm, herpes, scabies, erythema, etc., which do not require further elucidation here, since they have been individually discussed elsewhere.

Persistent itching at the anus complicated by weeping skin is often *eczematous* (eczema ani), and should be treated as such, especially when itching remedies have failed to relieve the patient.

SYMPTOMS

Patients afflicted with pruritus ani complain bitterly of itching in the terminal rectum and perianal region which is intractable and harassing, in fact, words cannot express the *torture* persons thus afflicted undergo.

This class of sufferers is extremely nervous, suffers from insomnia, melancholia, and pain incident to laceration of the skin caused by scratching, in addition to intolerable itching, which renders them unfit for social or business duties, and makes them a nuisance to themselves and friends.

Tantalizing pruritus which may be *remittent* or practically *constant* is invariably more distracting after the patient retires, and is intensified by warm clothing, worry, perspiration, and seeping through the anus of an irritating mucous or purulent discharge.

Victims claim it would be easier to bear acute pain than the unbearable itching with which they are harassed; patients have threatened to commit suicide unless promptly relieved, and pruritus ani is said to have been responsible for insanity.

Pruritus ani in aggravated instances causes a greater degree

of mental and physical suffering than almost any other disease or symptom. Because of the thickened leather-like condition of the anal mucosa and skin the patient derives practically no relief from rubbing the parts, yet he cannot resist scratching and tearing at the skin because of the tormenting or devilish itching, though he knows he will later suffer more intensely from pruritus, which is always aggravated by lacerations in the integument.

By examining the buttocks one can readily determine how the patient is doing, because if he has had a troublesome night or severe day attack the traumatized integument is sensitive, inflamed, edematous, or marked by numerous fissures and cup-shaped wounds caused by scratching and digging out pieces of skin varying from bird-shot to split-pea size (Fig. 448, right).

Many sufferers from pruritus analis do not rub the parts or employ the nails, but take a corn-cob, piece of wood, wire hair brush, or other strong rough object and actually dig into the flesh in attempts to gain relief from intolerable itching, and as a result foreign bodies used for the purpose have slipped into the bowel and severe injuries in the anorectal region have resulted from this practice.

The author was consulted about a man who died from peritonitis caused by his falling upon and driving a long hooked stick into the rectum with which he was scratching the anus. The family physician repeatedly attempted its removal by first pushing it upward to unfasten the hooked point and then pulling it downward, with the result that he pushed it further up and eventually perforated the bowel with the pointed fork, which caused death in a few hours from peritonitis.

Burning, stinging, and pricking pains add greatly to the patient's distress when the buttocks are extensively excoriated by the discharge, raw from scratching, or the skin is macerated and *waterlogged*—sodden—with an abundant serum-like secretion that constantly exudes from it.

Occasionally itching is confined to a small area at the side or around the anus, but in aggravated cases extends as far as the penis, sacrum, vulva, and in rare instances legs and abdomen are involved by a scale-like eruption, and indurated skin folds radiate in all directions from the anus.

Pruritus analis is often intensified by excessive smoking, eating of rich foods, drinking alcoholics, overindulgence in sexual intercourse, irregular hours, worry, psychic disturbances, or eating shell-fish.

Pruritic subjects have a peculiar walk due to irritation from

rubbing of the clothes, and frequently stop suddenly while talking, walking, or riding to scratch themselves, sometimes to the amusement of their friends who note the maneuver.

DIAGNOSIS

Pruritus ani is easily diagnosed by getting the patient's history, noting his symptoms, and examining the perianal region for *scratch-marks*, *pearl-white skin*, and *thickened rugæ* and *intervening crevices* that collect irritating filth and moisture, but considerable patience and exceptional ingenuity are required to ferret out the cause or etiologic factors responsible for the itching.

Since this condition is frequently secondary to disease or lesions, accompanied by a mucous or acrid discharge, the rectum, anal canal, and buttocks are investigated through the proctoscope, examined with the finger, and inspected to ascertain if the patient has fissure, fistula, hemorrhoids, polyps, procidentia recti, inflamed crypts, proctitis, or other affections that might cause pruritus ani; and examination of the uterus, vagina, prostate, and bladder is necessary to determine if disease in these organs influences itching of the anus or vulva.

Chemical and microscopic examination of local and intestinal secretions and the stools is sometimes advantageous, for in this way one can determine whether or not there are helminths—their segments or ova—*Entamœba histolytica*, *Balantidium coli*, tubercle bacilli, gonococci, *Shiga* bacilli, *Streptococci fecalis*, or other organisms in the bowel or skin that inflame or irritate the integument or mucosa and cause itching. The Wassermann and tubercular tests help to clear up the diagnosis in suspected cases of anorectal syphilis or tuberculosis.

When the patient is a child or young adult the anal canal and perianal skin folds are minutely inspected through a magnifying glass for thread-worms, a common cause of annoying itching in the young, and for pediculi occasionally responsible for pruritus analis.

A positive diagnosis of pruritus based upon local disease or infection is unsafe before constitutional diseases, rheumatism, gout, diabetes, or nephritis, sometimes responsible for localized or general itching, have been eliminated as a possible cause of the trouble. It is advisable to ascertain whether or not the patient suffers from a tumor or disease of the male or female genital organs that might induce reflex itching, is addicted to morphin, cocaine, or belladonna, or suffers from scabies, eczema ani, ringworm, herpes, or other skin affection involving the perianal region.

Finally, in acute pruritus analis it is essential to find out if the patient has partaken of tomatoes or strawberries to which he may have an idiosyncrasy, or has eaten lobster, clams, or other shell-fish known to have caused pruritus ani and general itching.

TREATMENT

Routine treatment is impracticable for pruritus ani because each case is a law unto itself.

Some patients apply for *temporary relief* and others to have pruritus *cured*, and the author insists on the sufferer making plain his wishes, because measures useful in stopping itching are often contraindicated in the curative treatment of pruritus analis.

When permanent relief is desired the case is declined unless the sufferer *places himself unreservedly in the author's hands for as long a time as may be required* to accomplish the desired result whether treatment is non-operative or surgical.

Non-operative Treatment.—The majority of pruritic subjects have previously undergone treatment and are familiar with drugs and measures usually employed in controlling this condition, hence a certain degree of *mystery* is advisable and the average patient is easier handled when kept in the dark as to the agents being used to relieve him.

Occasionally one may prescribe a home remedy, but it is essential that the sufferer believe the *real cure* is being effected in the office, otherwise he loses confidence or cuts his treatments to save expense, believing he can carry out treatment as well as the physician, a plan that invariably leads to dire results.

From a curative viewpoint persistent pruritus is undoubtedly the most difficult anorectal condition with which the proctologist must contend, and in many instances considerable ingenuity and unlimited patience are required to permanently arrest itching.

When a *constitutional affection*, as intestinal auto-intoxication, gout, rheumatism, Bright's disease, diabetes, hepatic obstruction, or disease in a neighboring organ—uterine procidentia, urethral stricture, prostatic enlargement, or vesical calculus—reflexly or otherwise aggravates perianal itching, it must be considered when planning treatment designed to relieve or cure the local condition.

Some physicians claim to have eradicated pruritus analis with therapeutic measures directed against constitutional ailments or through the correction of abnormalities in neighboring or distant organs responsible for reflex disturbances in the anorectal region, but the author has never known persistent itching of the buttocks

and rectal mucosa to be cured in either of these ways except where the treatment was reinforced by topical applications or local operation.

Since *excessive moisture* or an acrid discharge besmears the skin and augments or causes pruritus analis in many cases the author will briefly point out the most reliable methods of preventing irritation from this source.

The first and most important thing in the radical treatment of pruritus ani is to excise *diseased crypts, ulcerated hemorrhoids, hypertrophied papillæ, polyps, papillomata, condylomata, remove foreign bodies or fecoliths, and incise abscesses, blind and complete fistula, strictures, bands of scar tissue, fissures, and ulcers* that prevent a cure and eliminate any other operative disease of the mucosa or perianal skin that is causing the *hypersecretion* of mucus or formation of a dermatologic or rectal discharge.

Due attention is paid to correcting *neurogenic, gastrogenic, or interogenic disturbances, and tubercular, gonorrhœal, entamebic, syphilitic, helminthic, balantidic, catarrhal, malignant, or other form of coloproctitis* that keeps the mucous membrane and perianal skin soaked with an acrid or mucopurulent secretion.

Frequently it is necessary to resort to *non-operative* treatment and palliative measures to quickly relieve agonizing itching, heal scratch wounds, diminish sphincteralgia, enable the sufferer to obtain rest and sleep; when the patient declines to undergo the inconvenience, loss of time, or expense necessary for curative—operative—treatment while he is being prepared for operation, and when removal of lesions that originally caused pruritus have not arrested itching.

Non-operative and Palliative Treatment.—Essential features in the non-surgical treatment of pruritus analis consist in *cleanliness, rectocolonic irrigation, protecting and keeping the skin dry, preventing scratching, procuring comfortable daily stools, regulating the diet and manner of living, avoiding friction of the skin, building up the system, procuring rest and sleep, employing soothing, stimulating, and curative therapeutic agents, destroying thread-worms, injecting streptococcic vaccines, introducing anal dilators, and resorting to operation in selected cases.*

Cleanliness.—The buttocks, perianal radiating folds, and crevices in the skin are scrupulously cleansed not less than three times daily to keep the patient comfortable and mitigate pruritus, which is best accomplished with castile soap and warm water, boric acid, or lime-water together with hot—soothing—sitz-baths except when eczema ani is a factor, in which case the integument

is wiped with cotton soaked in oil, and then dried to avoid irritation incident to the employment of water.

Irrigation of the Colon and Rectum.—*Douching* of the anal canal following defecation and when the mucosa is smeared with irritating secretions mitigates itching, heals lesions, and tones up the lower bowel.

When colon and rectum are involved by catarrhal or specific coloproctitis complicated by *ulceration* and a profuse discharge containing pus, blood, mucus, and débris good results are obtained through irrigating the large intestine from anus to the cecum twice daily with a solution of ichthylol, balsam of Peru 2 per cent., permanganate of potassium $\frac{1}{2}$ per cent., boric acid 4 per cent., argyrol 4 per cent., or an infusion of oak bark, starch-water, or the accompanying krameria combination:

R. Acidi borici.....	3ij	40;
Sodium boraborate.....	3iss	60;
Fl. ext. krameria.....	3iv	1200.—M.

Sig.—Two teaspoonsfuls in a quart of warm water to be used as a colonic irrigation t. i. d.

Medicated bowel lavage is beneficial in many ways; colonic irrigation lessens congestion of the mucosa, heals raw areas, cleanses the bowel of acrid stools, washes out irritating discharges, pathogenic micro-organisms and dried mucus, diminishes fermentation and putrefaction, soothes the irritable bowel, and diminishes attacks of pruritus analis.

In cases of persistent itching caused or complicated by chronic diarrhea due to neglected ulcerative colitis accompanied by bleeding and a profuse mucopurulent discharge, lavage with the above irrigants is preceded two or three days by rectocolonic irrigations composed of silver nitrate, gr. x (0.6), to a quart of warm water.

Sometimes catarrhal and specific ulcerative lesions incite enterospasm responsible for gas retention and colic, which are aggravated by astringent, stimulating, and cold irrigation. Distressing enterospasm—spastic constipation—is relieved or prevented by abdominal hot fomentations, tincture of belladonna, gtt. v (0.3), taken four times daily reinforced by a hot emulsion enema containing bismuth subnitrate, 3ij (8.0); iodoform, 3ss (2.0), and olive oil, Oj (500.0), projected in the colon three times weekly.

Measures for Protecting and Keeping the Skin Dry.—Preventing irritating discharges from coming in contact with skin is the most important feature in the treatment of pruritus, and this is most satisfactorily accomplished by having the patient wear a small piece of cotton over the anus, separating the buttocks with a silk handkerchief or soft linen, applying a dusting-powder to the peri-

anal integument several times daily after cleansing of the parts, or coating the skin as often as required with a warm mixture of compound beeswax, sweet oil, and mutton tallow, equal parts, which as it cools forms an impermeable covering against mucous discharge and water. The accompanying hard ointment serves practically the same purpose:

R.	Phenol liq.....	$\frac{v}{m}x$	0|6;
	Menthol.....	gr. x	0|6;
	Camphora.....	gr. x	0|6;
	Sevum præparatum.....	q.s. $\frac{5}{3}j$	30|0.—M.

Sig.—Warm and apply over excoriated areas two or three times daily.

Satisfying results have also been obtained from the following glycerole:

R.	Pulv. alumen.....	gr. vj	0|4;
	Hydrarg. chlor. mite.....	gr. xv	1|0;
	Glycerinum.....	$\frac{5}{3}j$	30|0.—M.

Sig.—Paint over the raw surface.

Of the many dusting-powders employed for keeping the perianal skin dry and free from irritation none are more effective than the accompanying:

R.	Acidi borici }.....	$\frac{a}{a} 3ij$	8|0;
	Zinci stearas }		
	Talcum purificatum.....	$\frac{5}{3}j$	4|0.—M.

Sig.—Apply as required.

Prevention of Scratching.—Rubbing or scratching the affected area invariably aggravates itching, inflames the skin, increases pain, and delays healing, hence sufferers from pruritus are instructed not to irritate the parts in this way during the day, and to tie their hands or wear soft gloves while in bed to keep them from scratching and lacerating the integument while asleep; for many patients who retire with an *unbroken* skin often find it badly *torn* when they awaken.

Methods for Procuring Comfortable Daily Stools.—Constipation with firm stools or fecal impaction induces painful defecation and augments pruritus analis, discomforts easily forestalled or minimized by injecting a 3-ounce (90.0) oil emulsion containing bismuth, aristol, or iodoform, gr. x (0.6), into the lower rectum prior to defecation, or prescribing a mild laxative—aromatic cascara, $\frac{3}{2}$ iss (6.0), magnesium or sodium sulphate, $\frac{a}{a} 3ij$ (8.0), saline mineral water, 2 ounces (60.0), or a small ball of chopped figs and senna leaves taken nightly, which insures copious, non-irritating, soft daily movements.

Occasionally impacted feces require to be broken up with the

finger or gouge through the proctoscope and washed out with soapsuds enemata.

Regulating the Diet and Manner of Living.—Gourmandizing, eating highly seasoned foods, and overindulgence in spirituous liquors, tobacco, tea, and coffee aggravate or cause pruritus ani, and must be regulated until itching has been controlled.

Tomatoes, strawberries, shell-fish—lobsters, crabs, and mussels—are usually poisonous to this class of sufferers, hence are interdicted, and pruritic patients are not permitted to eat figs, raspberries, blackberries, or fruit having small seeds that may lodge in ulcers, fissures, crypts, rectal glands, or crevices in the skin, and cause excruciating itching and sphincteric spasm. Salt fish, wheat cakes, pastries, cheese, pickles, condiments, cucumbers, sauer-kraut, cabbage, pork, salmon, and sweets are discarded during acute pruritic attacks.

When pruritus analis is augmented or caused by eczema marginata the patient's condition is improved by open air, walking, abundant water drinking, and a restricted diet composed of cereals, fruit, meat soup, vegetables, fowl, certain fish, and a reasonable amount of red meat.

Avoiding Heat and Friction.—Since pruritus analis is made worse by irritation, pruritic subjects are advised against excessive walking, riding or rowing, sitting on rough, vibrating or slippery seats, using stiff or printed toilet paper, wearing rough clothing that causes friction, or indulging in violent exercise and working in hot rooms which causes copious perspiration, inflaming the skin.

Building Up the System.—Patients who are run down from auto-intoxication, anemia, deficient metabolism, or extreme nervousness and exhaustion, consequent upon incessant or nagging itching, need strengthening, which is accomplished by requiring the patient to sleep and live in the fresh air amid pleasant surroundings, exercise intelligently and tone up the system with hypophosphites, arsenic, iron, or strychnin, alone or in combination, and a nourishing diet reinforced between meals and at bedtime with milk and eggs.

Rest and Sleep.—Sufferers from intolerable itching of the anus, scrotal, or vulvar region obtain little sleep or rest day or night because itching begins or gets worse as soon as they retire, obtain a comfortable posture, or seek relaxation or sleep. Opiates are interdicted because they increase annoyance on the following day, and owing to his chronic condition the patient often becomes a *habitué* to them.

When relief is not obtained from hot sitz-baths, fomentations,

or soothing agents mentioned below, bromid of sodium, gr. xx (1.3), tincture of hyoscyamus, ʒ ss (2.0), medicinal, trional, sulphonal, or chloral hydrate, gr. x (0.6), taken as required, relieve insomnia and permit the patient to secure much-needed rest.

When loss of sleep and exhaustion are due to pruritus or severe pain incident to anorectal disease, quick relief is derived from suppositories containing belladonna, gr. $\frac{1}{2}$ (0.03), and cocaine, gr. $\frac{1}{4}$ (0.016), inserted every four hours, but when discomfort is less annoying it can be alleviated by hot oil enemata.

*Soothing, Stimulating, and Curative Agents.*¹—Soothing remedies are indicated during attacks of intolerable itching when anodynes are undesirable or fail to bring relief; sometimes distressing pruritus is quickly arrested by the application of canton flannel soaked in hot oil containing a slight amount of menthol, hot fomentations, sitz-baths, or sponging the parts with a warm lotion composed of distilled water, Oj (500.0), menthol, ʒ iss (6.0), and alcohol, ʒ ss (15.0), several times daily.

Frequent bathing of the skin with lime-water, lead and opium wash, or calomel and lime-water—"black wash"—applied to or wiped over inflamed or excoriated areas mitigates or arrests itching and pain incident to scratch wounds, and a weak solution of carbolic acid, chloral hydrate, or slippery elm bark infusion are also serviceable for the purpose.

Of the soothing lotions and ointments employed to relieve tantalizing pruritus analis, the following have proved reliable in the author's hands:

R.	Phenol. liq.....	ʒ j	4 0;
	Calamine prep.....	ʒ ij	8 0;
	Zinci oxidum.....	ʒ iv	16 0;
	Glycerinum.....	ʒ vj	24 0;
	Aqua calcis.....	ʒ j	30 0;
	Aqua rosæ.....	q.s. ad.	ʒ viij 240 0.—M.

Sig.—Apply as required.

R.	Cocainæ hydrochloridum.....	gr. x	0 6;
	Phenol liq.....	gr. x	0 6;
	Thymolis iodidum.....	ʒ j	4 0;
	Pulv. amyrum.....	ʒ j	4 0;
	Zinci oxidum.....	ʒ iss	6 0;
	Adeps lanæ hydrosus.....	ʒ j	30 0.—M.

Sig.—Apply morning and night to the anal canal through a pile-pipe and daily on the perianal skin.

R.	Cocainæ hydrochloridum.....	gr. viij	0 53;
	Hydrarg. chlor. mite.....	ʒ j	4 0;
	Ext. belladonneæ.....	gr. x	0 6;
	Ungt. stramonii.....	ad. ʒ j	30 0.

Misce et fiat unguentum.

Sig.—Apply as often as required to control itching.

¹ Following the suggestion of Barnes the author has succeeded in relieving pruritus by bathing the itching parts twice daily with an Epsom salts solution (ʒ ij-Oj).

Stimulating agents often induce discomfort or pain, but contribute materially to the patient's relief on the following day, and accomplish more toward a cure than soothing applications. Pain from them is lessened or prevented by previously covering the affected area with cotton soaked in a 10 per cent. cocaine solution.

Silver nitrate, 6 per cent., and ichthyol, 25 per cent. solutions are reliable healing agents for scratch-wounds of the perianal skin when used night and morning. The former is preferable since it changes to the albuminate of silver and forms a protective covering over raw surfaces, thereby affording the patient marked relief. These agents cause considerable pain and do more harm than good when applied very strong or full strength. Carbolic acid, tincture of iodin, and pure silver nitrate are sometimes painted over the surface with the object of removing scarf-skin, a practice discountenanced by the author, since it is of no value and responsible for excruciating pain lasting for hours.

*Antipruritic and Curative Agents.*¹—Distress from itching and pain are frequently arrested by topical applications of orthoform, analgin, anesthetin, or 10 per cent. solution of cocaine or eucain.

When intolerable itching has been relieved in the above manner, antipruritic agents are applied, the most dependable of which are carbolic acid, oil of cade, salicylic acid, ammoniate and nitrate of mercury, iodin, zinc oxid, calamin, menthol, camphor, resorcin, bismuth oleate, ichthyol, Epsom salts, and hydrastis, used alone or in combination as a lotion, powder, ointment, or enema.

The accompanying *lotion* has usually proved reliable in the author's hands:

R.	Menthol.....	gr. xl	2|6;
	Cocaine hydrochloridum.....	3ss	20;
	Glyceritum phenolis.....	3j	40;
	Alcohol.....	3ss	150;
	Aqua destillati.....	q.s. ad. 3iv	1200.—M.

Sig.—Apply on cotton when needed.

For aggravated pruritus characterized by a pearl-white skin and thickened indurated perianal rugæ no remedy excels the nitrate of mercury—citrine ointment employed alone or in the following combination, which transforms the white, indurated, corrugated, immobile integument into a thinner, more supple, pinkish skin:

R.	Phenol liq.....	xxx	1|3;
	Sulphur præc.....	3ij	120;
	Ungt. hydrat. nit.		
	Adeps. lanæ hydrosus}	aa 3ss	150.—M.

Sig.—Apply and leave on for one or several hours daily according to indications after bathing the parts with hot water and drying the skin with cotton.

¹ Hanes reports satisfactory results in the treatment of *pruritus ani* obtained from injecting hydrochloric acid 1 : 3000 into and beneath mucosa and skin of the itching area to destroy bacteria responsible for infection and pruritus. Hypodermics were preceded by novocain to prevent pain.

When pruritus analis is secondary to *proctitis*, itching is persistent and the integument is greatly distorted by corrugated skin folds, fissures, and scratch wounds, the author carries out the following routine daily until pruritus has been mitigated or cured and the integument assumes a normal appearance:

1. Daily normal stools are procured by laxative or oil enemata.
2. The anal canal and lower rectum are douched with $\frac{1}{3}$ glass of cool water containing $\frac{1}{2}$ teaspoonful (2.0) of the fluidextract of krameria.
3. The perianal skin is thoroughly cleansed of rancid ointment and remains of other remedies with hot water or olive oil if eczematous.
4. The integument is wiped dry; excoriations, fissures, and deep-scratch wounds are painted with silver nitrate, 6 per cent., which is permitted to dry, after which the dressing is completed by placing a gauze pad smeared with *citrin ointment* over the pruritic area held in place by a snug T-binder covered with oiled silk to protect clothing.
5. Before retiring the ointment is removed by hot water or oil, the parts are dried, and if there is itching one of the before described soothing lotions or ointments is applied.

When the nitrate of mercury ointment causes severe pain its strength is reduced with vaselin or lanolin. Treatments are varied to meet indications and continued until desired results are obtained.

6. Three teaspoonsfuls (12.0) of the accompanying hydrastis combination is projected into the anal canal night and morning until catarrhal proctitis is better, when the rectum is irrigated three times weekly with the krameria solution previously recommended.

R.	Fl. ext. hydrastis.....	3ij	8|0;
	Fl. ext. hamamelis }.....	aa 3j	30|0.—M.
	Oleum olivæ phenolis}.....		

Sig.—Shake well and inject 3 teaspoonsfuls into the rectum daily after stool.

Eczema ani induces or aggravates pruritus, and the skin should be cleansed with olive oil in preference to water, following which it is brushed with the accompanying lotion or smeared with the ointment given below:

R.	Liq. carbonis detergens }	aa 3j	30|0;
	Glycerinum		
	Calamine prep.....	3sss	2|0;

Sig.—Paint on two or three times daily with brush and allow it to dry.

R.	Oleum cadium.....	3iv	15|0;
	Ungt. zincii oxidi.....	3iv	120|0.—M.

Sig.—Smear over affected parts t. i. d.

Treatment of Helminths—Oxyuris Vermicularis.—Pin-worm infection is common in children from two to twelve years of age, but is seldom encountered in adults. The habitat of thread-worms is the small intestine and cecum, which accounts for the frequency with which topical applications and rectal enemata fail to relieve or cure pruritus ani due to this type of irritation.

The parasite of oxyuriasis varies from $\frac{1}{10}$ to $\frac{3}{5}$ inch (2.54–15.24 mm.) in length and resembles a piece of fine white thread, and finds lodgment in the mucous and perianal skin folds (Fig. 446), where it incites intractable itching.

Pin-worms responsible for pruritus are usually destroyed with santonin, gr. j to iv (0.06–0.24), taken twice daily in conjunction with enemata of acetic acid, quassia, turpentine, or benzoin. When low and high injections fail to eradicate parasites, *appendicostomy*, *cecostomy*, or Gant's *ileocecostomy* are indicated, so that worms and their ova located in the ileum, cecum, colon, or rectum may be eradicated with the aid of copious through-and-through medicated irrigation.

Radiotherapy.—There are reported cures of pruritus ani accomplished through *x-ray* exposures, but this therapeutic agent has not given satisfaction in the author's cases unless eczematous, which indicates the condition is not an eczema, since *x-rays* are wonderfully effective when applied to eczematous patches elsewhere.

Vaccine Therapy in Coccogenous Pruritus Analis.—In cases of pruritus ani due to streptococcal infection—usually *fecalis*—an autogenous vaccine made from organisms obtained from scraping the mucosa and perianal skin has frequently proved curative in Murray's hands, and a few of the author's selected patients have been temporarily relieved or apparently cured by stock or autogenous vaccine treatment.

Since the *Streptococcus fecalis* is ordinarily the chief cause of the infection, a vaccine manufactured from this organism is usually employed. When other streptococci, staphylococci, and colon bacilli alone, together, or with the *Streptococcus fecalis* are encountered in the scrapings, better results are obtained from a *mixed* or vaccine made from the organisms dominating the infected region.

Troublesome excessive reaction is avoided through employing small initial doses of the vaccine and not repeating the injection until disturbances from the previous one have disappeared.

Beginning with 130,000,000 dead bacteria, Murray increases the dose up to 2,000,000,000, a plan that has proved satisfactory.

The author concedes streptococcal infection is an etiologic

factor in some cases of pruritus ani, and that patients so afflicted are sometimes relieved or cured by autogenous vaccines, but does not believe that *coccogenous* itching occurs as frequently as pruritus ani from other causes.

Since the inflammatory process resulting from infection involves superficial skin layers easily reached by drugs it is difficult to understand why infecting *streptococci* cannot be effectively destroyed by ionic medication, topical applications—iodin, bichlorid, etc.—or lotions and ointments recommended above, and with this end in view the author often combines vaccine with local treatment.

Ionic medication, suggested by Rolfe, frequently relieves and sometimes cures troublesome pruritus ani induced by *Streptococcus fecalis* infection owing to the liberation of *ions* the result of *electrolytic* action upon solutions of metallic salts—*zinc, copper, mercury, iodin*, and other agents possessing antiseptic properties; with the aid of the electric current organisms deeply located are destroyed by medication that does not reach them when used in a solution or ointment applied to the skin.

Rolfe has found the following aqueous solutions of metallic salts, zinc sulphate, zinc permanganate, mercury oxycyanid, iodin (Lugol), potassium iodid, 1 per cent., effective in selected cases, the first three being *electropositive*, and iodin *electronegative*.

The current is gradually increased until strong as can be comfortably borne, continued for fifteen minutes, and then gradually reduced to zero. Applications are made daily or three times weekly, according to indications, and Rolfe prefers mild zinc solutions when the integument is *moist, irritated, and blanched*, or oxycyanid of mercury when zinc fails, and employs iodin solution when the skin is *dry, thickened, and fissured*.

The author has had a limited experience with the ionic treatment of pruritus ani, but a study of Rolfe's statistics indicate that it is worthy of a trial in selected infected cases, but should not be considered a *cure-all* for this troublesome affection.

Pressure.—Introduction and leaving in the anal canal for several hours or over night of medium-sized, firm, self-retaining anal dilators occasionally mitigates itching for two or three days, probably through lessening venous engorgement, producing temporary anesthesia of sensory nerves through pressure, or stretching an irritable sphincter under local anesthesia.

Surgical Treatment.—Pruritus analis induced by fissures, ulcers, hemorrhoids, infected crypts, abscess, fistula, or other lesions complicated by a pus or mucopurulent discharge is quickly cured

by operation where disease responsible for the itching is removed and sensory nerves entangled in the skin are severed or liberated through treatment.

On the other hand, where pruritus is secondary to colitis, proctitis, cryptitis, or other affection responsible for chronic congestion of the mucosa, and hypersecretion of mucus that seeps through the anus and irritates perianal skin, the benefit derived from operations described below is *temporary* unless special treatment directed against the affection causing the discharge responsible for itching is subsequently carried out.

Some surgeons have attempted a radical cure by destroying outer layers of the integument with a *curet* or *Paquelin cautery*

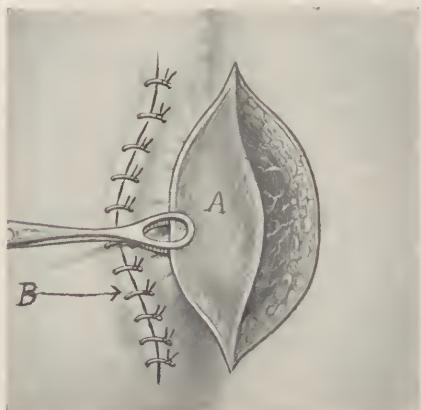


Fig. 450.—Ball's operation for pruritus ani: A, Skin-flap dissected loose to expose attached nerves; B, wound closed with interrupted catgut sutures.

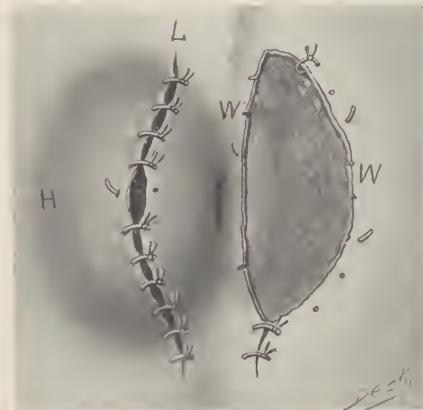


Fig. 451.—Hematoma and breaking down of wound after Ball's operation: H, Hematoma; L, suture line breaking down; W, wound edges widely separated.

under general anesthesia, but relief thus obtained is not commensurate with consequent inconvenience, expense, and suffering. Matthews, with this object in view, dissected away skin of the perianal region, which is an objectionable procedure because sometimes through subsequent contraction of resulting scar tissue the sphincter is impaired, nerves and blood-vessels are constricted, or anal stricture forms sequelae that aggravate the patient's condition.

Hamilton makes *multiple incisions* through *thickened radiating rugae*, a procedure that may give temporary relief, but is not curative.

In many instances the author has succeeded in permanently arresting pruritus ani by *removing skin-tabs* and *excising all thickened indurated skin folds* with forceps and scissors after the manner shown in the accompanying illustration (Fig. 449, B) alone, or in

conjunction with operative measures designed to eradicate lesions originally responsible for pruritus analis.

When discussing the etiopathology attention was called to the certainty with which *chronic dermatitis*, however produced, associated with perianal itching, invariably *obstructs vessels* and *ensnares nerve endings* through the formation of fibrous tissue in and beneath the integument. To produce *anesthesia*, free entangled nerves and constricted vessels from subcutaneous adhesions (Fig. 449, A) aggravating or causing pruritus analis the following operations were designed:



Fig. 452.—Appearance of anus and buttocks after Ball's operation performed by the author. Note extent of the wounds and partial breaking down of suture lines.

Ball's Operation.—In this procedure, through lengthy incision made on either side of the anus, nerve connections are destroyed by dissections that detach the skin over the itching area up to the anal outlet (Fig. 450, A), after which wounds are closed with interrupted catgut sutures (Fig. 450, B).

Ball's operation produces anesthesia of the skin as far as it goes, but possesses several *disadvantages*: (a) elaborate preparation and perfect aseptic technic are necessary; (b) general anesthesia is employed; (c) the operation requires considerable time, and the patient is confined in the hospital for days or weeks; (d) it does not include the severance of nerves over all itching areas external

to the incision, in front toward the scrotum and backward near the coccyx; (e) dissections are not carried into rectum beneath the mucosa, and itching within the anal canal is not relieved; (f) it does not provide for drainage, and infection is a frequent complication;

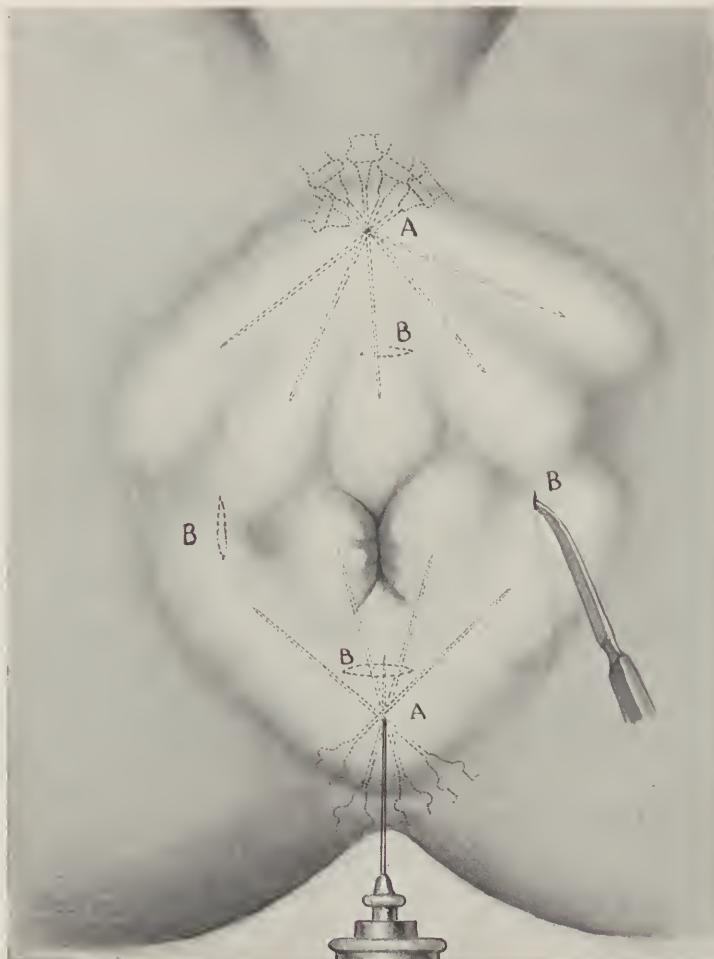


Fig. 453.—Preliminary steps in author's buttonhole operation for pruritus ani: *A*, Technique of infiltrating integument with eucain and appearance of the whitened perianal skin when anesthesia has been accomplished; *B*, buttonhole incision.

(g) small or large hematoma frequently form beneath the integument; (h) through injury to vessels made by long incisions extensive sloughing of the skin occasionally ensues, and (i) when the sutures break down the skin retracts on either side of the anus, leaving extensive raw wounds (Fig. 451) that require several weeks to heal.

Author's Simplified Local Anesthesia Buttonhole Operation for Pruritus Analis.—This procedure is attractive to patient and operator, because it is easily, quickly, and painlessly performed under local anesthesia, causes but slight postoperative discomfort, confines the patient to bed for one in mild, and three days in aggravated cases, is not followed by the formation of hematoma, infection, or sloughing of skin, and relieves pruritus of both the lower rectum and perianal region.

First Step.—The anal quadrants and involved outlying skin area are successively anesthetized by introducing the needle at dif-

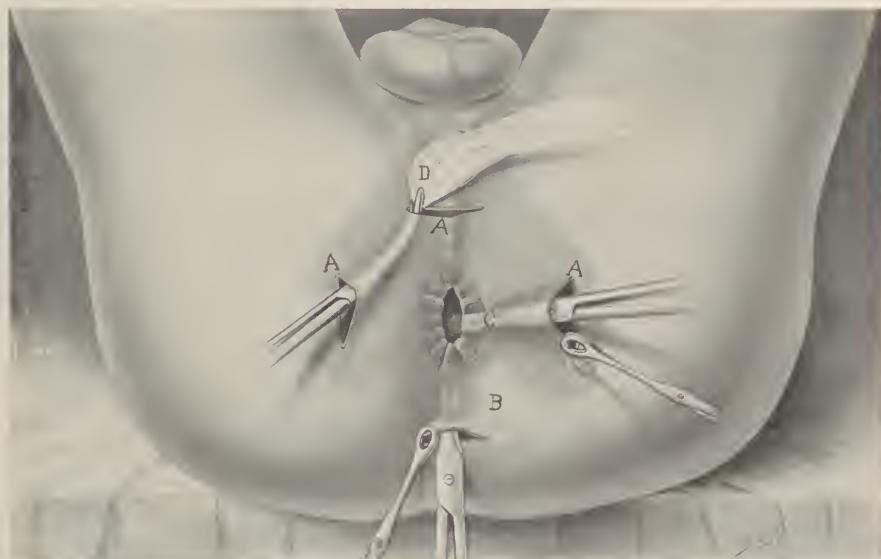


Fig. 454.—Intermediary steps in author's buttonhole operation for pruritus ani: Dots indicate anesthetized pruritic areas; *A*, buttonhole incisions; *B*, subcutaneous nerves being separated from the skin; *C*, severing submucous nerves with scissors passed beneath the skin and over the sphincter; *D*, drain being drawn through one opening and out at another beneath undermined skin.

ferent points (Fig. 453, *A*), care being taken to avoid unnecessary pain by slowly anesthetizing superficial skin layers, and then infiltrating the integument and underlying structures until they assume a *glassy white appearance*, which indicates anesthesia is complete.

Second Step.—Sensory nerves throughout the pruritic area are severed from the integument by dissections made first in one direction and then another with blunt scissors introduced through buttonhole slits made in the skin with a bistoury (Fig. 453).

Third Step.—Having freed the integument around the anus,

scissors are guided upward over the sphincter (Fig. 454, *A*), and sensory nerves going to the mucosa of the anal canal are divided in like manner (Fig. 454, *B*).

Fourth Step.—The wound is freed of blood by firmly rolling a gauze pad over the loosened skin.

Fifth Step.—With long, narrow, curved forceps narrow vaselin-covered gauze strips are in turn drawn through one opening and out at another (Fig. 454, *D*), and spread out with a dressing rod, separating integument and deeper structures; the ends of all drains are left projecting through the buttonhole-like openings, which insures drainage and forestalls the formation of hematoma (Fig. 451).

Sixth Step.—The operation is completed by covering the parts with a thick gauze pad retained in place by a wide, tightly adjusted T-binder which through pressure controls bleeding.

Advantages of the Author's Buttonhole Pruritus Ani Operation.—

1. Preliminary preparation and shaving of the patient are unnecessary.
2. Local is substituted for general anesthesia.
3. It is painless and requires but ten minutes.
4. May be performed in the office, home, or hospital.
5. Confines the patient to bed but a day or two, or not at all, and does not prevent his keeping social or business engagements thereafter.
6. Causes little or no defecatory or postoperative pain since anesthesia is induced through the severance of nerves.
7. It divides subcutaneous adhesions (Fig. 449, *A*) and smoothes out thickened radiating skin-folds and creases; produces complete anesthesia, and immediately arrests rectal and perianal itching.
8. Owing to the manner of placing gauze inserts drainage is insured which protects the sufferer against hematoma and infection.
9. Dissections are carried over the sphincter and under mucosa of the anal canal, which eradicates rectal itching.
10. Stitches are not employed, consequently postoperative pain is practically *nil* and there is no suture line to give way, causing skin retraction and leaving of extensive, irregular, raw wounds that require weeks to heal.
11. Insertion of initial and postoperative drains prevent over-rapid re-establishment of connection between divided sensory nerves and the skin (Fig. 455).
12. Abscess, fistula, sloughing, prolonged convalescence, and sequelæ have not followed the operation.
13. Results are better than from Ball's operation because submucous nerves are also severed.

Drains are removed and re-inserted daily after subcutaneous spaces have been syringed with a hot boric solution, and dried until the discharge has ceased.

Since the author's operation eliminates enlarged radiating rugæ and produces anesthesia of the skin, topical applications are unnecessary to relieve and prevent itching, but colitis, proctitis, and anorectal lesions not taken care of by the operation require operation or treatment until they cease to produce irritation,

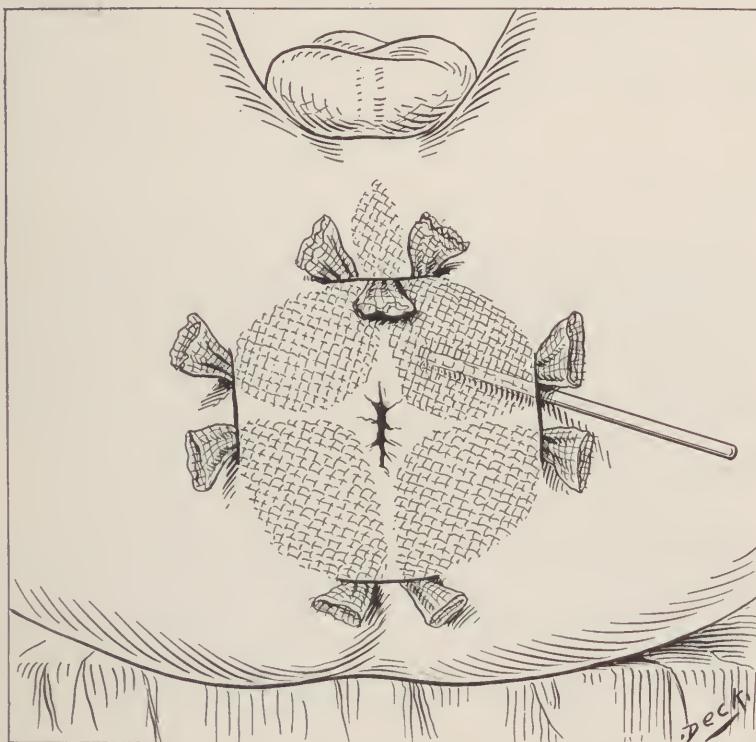


Fig. 455.—Final step in the author's buttonhole operation for pruritus ani, showing arrangement of vaselin soaked gauze strips following introduction of the drains which fore-stall hemorrhage, reanastomosis of divided nerves, formation of hematoma, and infection.

hypersecretion of mucus, or an irritating discharge that would sooner or later renew itching.

Except when the patient is from out of town, demands immediate relief, or is unable to undergo the expense of office visits, the author usually advises him to defer having *sensory nerves divided* until non-operative measures have been tried and failed.

Following 100 of the author's operations for pruritus ani and vulvæ, in 35 per cent. itching ceased immediately and perma-

nently; in 20 per cent. slight itching occurred after a few days and disappeared permanently within six weeks; in 35 per cent. pruritus was controlled for a few weeks, when it recurred and continued until relieved by non-operative measures, and in 10 per cent. of cases there was no improvement after six weeks.

These results indicate that entangling of nerve filaments is not always responsible for pruritus or that the operation has not freed all involved nerves, and that subsequent treatment in a fair percentage of cases is necessary to eradicate the disease originally responsible for itching temporarily arrested or mitigated by the operation.

Following thorough separation of nerve endings and subcutaneous adhesions from the skin operative anesthesia lasts from two to ten weeks, when sensation gradually returns, hence the author endeavors to eliminate all etiologic factors in pruritus before nerves begin functioning normally.

While the author concedes circulation in the skin is helped by operative smoothing out of radiating rugæ, he does not believe severing the inferior hemorrhoidal artery, as claimed by Beck, benefits this condition, nor does it seem reasonable that cutting the inferior hemorrhoidal nerve would bring relief, since the itching area is often larger than that controlled by this nerve, and because desensitization of the skin has not followed division of this and other nerves in fistula operations.

PRURITUS—SCROTI AND VULVÆ

Troublesome *itching of the scrotum*, sometimes extending to the under surface of the penis with thickening of the skin, exists independently or in connection with pruritus analis, but since the etiology, pathology, diagnosis, and treatment is similar, further discussion of the subject is unnecessary.

Pruritus vulvæ may be confined to the vulvar region, extend to the perineum, or be associated with pruritus ani and involve the perianal skin. It may be caused by anorectal affections, disease in the vagina, uterus, or bladder, complicated by an acrid discharge or irritating urine, the menopause, pregnancy, vaginal polypi, or atrophy of the skin covering the vulvæ.

Aggravated pruritus vulvæ is characterized by excoriations, sulci, and raised ridges affecting the skin of the vulvar and perianal regions, and hypertrophy of the clitoris induced by incessant scratching.

The difference between the treatment of pruritus vulvæ and pruritus ani is so slight that a separate discussion is not required, and their individual treatment is further rendered unnecessary because of the frequency with which they are associated.

Chapter XL

Skin Affections of Perianal Region and Buttocks

SKIN diseases at the anal margin or upon the buttocks complicated by burning or itching are fairly common, particularly in young children and infants, the result of digestive disturbances, acrid discharge, or wet diapers, and in adults having rheumatic or gouty diathesis, or who suffer from amebiasis, pellagra, diabetes, or chronic nephritis.

Perianal skin lesions may originate in the integument or be induced by acrid discharges or extension of rectal affections.



Fig. 456.—Blastomycosis of buttocks (Howard Fox).

Venereal diseases—luetie and non-luetie—especially proliferating types, are frequently encountered in the perianal region, terminal rectum, or both simultaneously, being inherited or acquired, viz.: *Rectal and vaginal gonorrhea*, causing erythema, *chancroids* accompanied by ulceration and irritation of the skin; *condylomata acuminata*—non-luetic—papillomata, *perianal fissures*, and *ecchymoses* incident to pederasty or rectal onanism, masturbation—and luetie, *primary, secondary, and tertiary* lesions—*chancres, mucous patches, ulcers, erosions and fissures, papular eruption, condylomata lata, gumma, and erythema from proctitis syphilitica*.



Fig. 457.—Pityriasis rubra pilaris (G. H. Fox).

Having fully discussed venereal skin affections, tuberculosis cutis ani, verrucæ, and epithelioma elsewhere their further consideration is unnecessary.



Fig. 458.—Vitiligo of anus—leukoderma (author's case).

In addition to the above the following skin lesions have been encountered about the anus or upon the buttocks: *eczema* (Fig.

460), *erythema intertrigo*, *furunculosis*, *scabies*, *elephantiasis* (Fig. 473), *blastomycosis* (Fig. 456), *tinea circinata*—ringworm (Fig. 462), *impetigo*, *psoriasis*, *dermatitis venenata*, *lymphangioma circumscriptum*, *pityriasis rubra pilaris* (Fig. 457), *xanthoma*, *vitiligo*, *leukoderma* (Figs. 458, 459), *erysipelas*, *lichenization*—hardening of buttocks from any irritation—*hypertrichosis* (Fig. 461), and *linear burrowing* eruptions on the buttocks and labia.

Of the above diseases only those most frequently encountered in the perianal region will be discussed.

Erythema Intertrigo—Chafing.—This form of dermatitis, characterized by redness and abrasions or maceration of the epidermis,



Fig. 459.—Vitiligo of the arms, back, perianal region, and legs (Howard Fox).

feeling of heat, and soreness, is most often encountered in children and fat persons whose buttocks remain in contact or perspire freely.

The condition is relieved by frequent bathing, using astringent lotions, drying, and dusting the parts with powder composed of talcum and zinc stearate, keeping the buttocks separated with soft linen or silk, and applying lime-water or accompanying ointment to the irritated surfaces following silver nitrate (6 per cent.) applications, when fissures are troublesome:

R. Zinc <i>i</i> oxidum}	.....	aa 3j	4|0;
Amylum }			30|0.—M.
Ungt. petrolati.....		q.s. 3j	

Sig.—Apply morning and night.

Herpes of the perianal region may be the result of neuroses, rheumatic or gouty diathesis, pregnancy, acute fever, irritation to the skin by clothing, stretching of the anus, and other causes. As elsewhere, vesicles may be single, multiple, or in groups; and later, as a result of irritation and infection, form pustules that break down, leaving fissures or ulcers in and around the anus.

Such lesions exude a whitish discharge and the patient complains of annoying pruritus and discomfort, or acute pain when irritated by wearing apparel or bruising during defecation.

The *treatment* of herpes here is similar to elsewhere and consists in restricting diet, securing soft evacuations, avoiding purgation, strong topical applications, active exercise, and scratching or irritating excoriated areas, and dusting vesicles or ulcers with a powder composed of zinc stearate and bismuth, tannic acid or aristol, which hasten drying up of lesions, or applying the following soothing, healing ointment as indicated:

R.	Resorcinol.....	gr. x	0|6;
	Zinci oxidum}	.....aa	3ij 8|0;
	Amylum.....	.....aa	3ij 30|0.—M.
	Ungt. petrolati.....	q.s. ad.	
Sig.—Apply twice daily.			

Local treatment is reinforced by arsenic or other tonic.

Eczema (Fig. 460) involving the scrotum, buttocks, and perianal region is occasionally encountered in stout individuals suffering from rectal discharge, and children, from wet diapers, and the eruption may be of the *dry* or *moist* variety, the latter being most frequent.

Weeping is characterized by erythema, macerated skin, and intolerable pruritis, while in dry eczema the skin is of a pale reddish hue, brittle, or cracks during defecation or separation of the buttocks.

In the former discharge is abundant, pasty, obnoxious, and constantly soils and causes caking of clothing. Perianal eczema if neglected leads to extensive excoriation of the anal mucosa and adjacent skin, or formation of numerous deep, elongated fissures or well-defined ulcers.

The chief *manifestations* of eczema of the perianal region are painful defecation, discomfort while exercising, irritation incident to discharge, occasional crust formation and rubbing of clothing, intolerable itching, and extreme nervousness in patients believing they have an incurable disease.

Treatment of eczema involving the perianal region, buttocks, and scrotum is discouraging, and different remedies must be tried

before the right one is found. Means must be taken to minimize or prevent irritation of the anal canal and skin, which is best accom-



Fig. 460.—Eczema marginatum.

plished by softening the stools through the administration of sulphur, saline laxative, or small dinner pill, regulating diet, bathing parts



Fig. 461.—Hypertrichosis where hairs resembling a beard covered the anus (Howard Fox).

with oil in the moist, and hot water in the dry form of eczema, limiting exercise, prohibiting scrubbing or scratching integument,

and employing of light stimulating solutions, caustics, and ointments.

Complicating rectal disease accompanied by discharge must be eliminated, otherwise eczema recurs. When lesions extending to the anal canal causing sphincteralgia are not relieved by hot fomentations, topical applications of ichthyol, 10 per cent., balsam of Peru, 20 per cent., or suppositories containing ichthyol, belladonna, and cocaine, the anal muscle is divulsed or incised.

Erosions or ulcers causing intolerable itching and painful defecation readily yield to silver nitrate (6 per cent.) application, keeping parts dry, and wearing a silk handkerchief between legs; this adds greatly to the patient's comfort through preventing irritation by clothing and keeping soggy buttocks apart.

Associated proctitis is most quickly relieved or cured by nightly injections of olive oil, $\frac{3}{5}$ ij (90.0); containing bismuth, $\frac{3}{5}$ ss (2.0), or colorless hydrastis, $\frac{3}{5}$ j (4.0) in water $\frac{3}{5}$ iv (120.0), and daily antiseptic stimulating spray employed through a proctoscope.

Constitutional treatment and water drinking are useful in gouty and rheumatic patients, alkalines in the presence of diabetes, and arsenic hypodermically when the patient is debilitated.

Tenacious eczematous discharges are satisfactorily removed with a mild peroxid solution, or lead-and-opium wash, the latter acting as a sedative to inflamed skin. Dusting-powder composed of zinc stearate in combination with bismuth, lycopodium, aristol, or orthoform are useful adjuvants except in aggravated weeping eczema, where they cake, adding to discomfort unless frequently changed following drying of the parts.

One of the most effective formulæ for perianal eczema is the following when preceded by hot fomentations:

R. Zinci oxidum.....	$\frac{3}{5}$ j	4|0;
Ungt. picis, liq.....	$\frac{3}{5}$ ij	8|0;
Ungt. petrolati plumbici.....	q.s. ad. $\frac{3}{5}$ j	30|0.—M.

Sig.—Apply as required.

When other measures fail, radiotherapy, fulguration, or cauterization of the diseased areas in the skin are occasionally helpful.

Furunculosis—Boils.—Single and multiple diminutive boils (see p. 287 and Figs. 217, 218) are frequently encountered upon the buttocks of children who have been swimming in dirty water, persons having diabetes, and who have irritated the skin by long or rough riding, which favors entrance to and infection of hair-follicles by staphylococci.

Furunculosis (Fig. 217) is sometimes prevented or aborted

by administration of autogenous sera, tonics, brewer's yeast, and applying ichthyol ointment, 10 per cent., or bichlorid solution. When furuncles are of considerable size and contain pus immediate relief and a quick cure follows evacuation of contained pus and necrotic tissue.

Scabies.—Itch is common and troublesome upon the buttocks, but its true nature is often not suspected because of excoriation of parts by scratching. Scabies here as elsewhere responds quickly to sulphur and mercury applications.



Fig. 462.—*Tinea circinata*—ringworm of perianal region (Trimble).

Tinea Circinata.—Ringworm lesions (Fig. 462) in the perianal region may be independent or associated with the disease elsewhere. Tonics, cleansing the patches with green soap, and *parasiticide* applications of resorcin and alcohol or vaselin, or an ointment containing sulphur or ichthyol are effective in mild, but painting lesions with iodin is required in severe cases.

Psoriasis.—Psoriatic patches, rarely encountered upon the buttocks, are treated by plain diet, Fowler's solution, or iron and quinin, removal of scales with water and green soap, and employment of the following ointments:

R. Betanaphtol}		āā gr. xxiv	1|6;
Resoreinum }			
Ungt. petrolati.	3j	30	0.—M.

Sig.—Apply.

or,

R. Hydrargyrum ammoniatum.....	gr. xvij	1|2;	
Sulphur precipitatum.....	gr. xij	0|72;	
Ungt. petrolati.....	q.s. 3j	30	0.—M.

Sig.—Apply.

Erysipelas.—Since streptococci—causative agents—are constantly found in the perianal skin it is remarkable that this type of inflammation is not more common here, since the parts are daily irritated by toilet paper or scratching. One of the author's patients suffered repeatedly from *facial erysipelas* following acute attacks of *pruritus ani*, the infection apparently being transferred to nose or face by the fingers.

The *treatment* embraces cathartics, iron and quinin, vaccines, and local application of Burow's solution, boric acid, or 15 per cent. ichthyl ointment.

Dermatitis Venenata.—This variety of perianal dermatitis is induced by contact of skin with caustics, chemical irritants, iodoform, poison ivy, or dogwood, which is followed by reddening, blistering, edema, or swelling of the integument, and burning pain and itching.

Briefly summarized, *treatment* consists in applying soothing and astringent agents, lead-and-opium wash, zinc and boric acid ointments, or equal parts of buttermilk and lime-water applied to the skin as often as required.

Elephantiasis.—Anovulvar elephantiasis (see Chapter XLIII) several times observed by the author is a condition characterized by chronic hypertrophy of the integument and subcutaneous tissues caused by chronic inflammatory diseases—usually infectious—that block the lymphatics, causing slight or marked distortion of the parts by the neoplastic process.

In the perianal region elephantasic masses (Figs. 473, 474) are firm, covered by thickened, whitish, adherent skin, non-sensitive, and may be ovoid, nodulated, or hang in clusters like polyps or grapes, being sufficiently numerous and large to conceal the anus, labia, or both, striking examples of which are seen in Figs. 473, 474.

Elephantiasis—so-called *esthiomene* and *lupus* (Fig. 471) difficult to differentiate or usually encountered in depleted individuals suffering from chronic anorectal or vaginal tuberculosis, syphilis, ulcerative lesions, or affections of the bowel complicated by discharge constantly exuding through the anus.

Thickening of the tissue may exist independently, precede or follow the formation of superficial and deep ulcers that may be serpiginous, or form white cicatrices as they heal in one and break down in another direction, but in either case the hypertrophic process is augmented by streptococcal infection.

Anovulvar elephantiasis (Fig. 474) is accompanied by an offensive irritating discharge, discomfort while walking or riding, and occasional obstruction of the anus or vaginal orifice, and death in such cases usually results from causative or complicating disease and not from hypertrophic changes.

Elephantiasis of the anovulvar region is difficult to arrest or cure; conservative measures, embracing an outdoor life, mild exercise, forced feeding, and-antisyphilitic or tubercular remedies, rectal and vaginal ichthyol, 2 per cent., irrigations, together with methylene-blue, 10 per cent., silver nitrate, 6 per cent., or argyrol, 20 per cent., applications to fissures and ulcers upon and in crevices between hypertrophied masses, are to be relied upon in most cases.

When palliative measures prove ineffective elephantasic tumors are excised and wounds are sutured or left to heal by granulation when the discharge would prevent union, following which skin ulcers are fulgurated or cauterized and inflammatory lesions in the vagina and rectum are treated with medicated irrigations and local stimulating applications until inflamed, fissured, or ulcerated areas in the mucosa have healed and the irritating discharge from them has ceased to irritate the perianal and vulvar region.

Pruritus Ani.—Skin lesions of various kinds may cause or be associated with chronic pruritus ani, a troublesome condition fully discussed in Chapter XXXIX, to which the reader is referred.

Irritation of the skin about the anus occasionally results from *Oxyuris vermicularis*—thread-worm—and resultant discharge and scratching. Skin eruptions of the buttocks are also observed in contagious diseases of childhood, and occasionally following eating of shell-fish, strawberries, or taking bromid of potassium, iodid, quinin, antipyrin, and other drugs.

Chapter XLI

Tuberculosis of the Rectum, Anal Canal, and Perianal Region

ULCERATIVE, HYPERTROPHIC, NEOPLASTIC, FIBROSCLEROTIC—GAS-PIPE RECTUM, MILIARY, VERRUCOSE, WARTY, AND CUTANEOUS

TUBERCULOSIS of the small intestine, colon—*T. colitis*—and sigmoid flexure having received due consideration elsewhere the author will confine his discussion here to lesions affecting the lower extremity of the large intestine which not infrequently are a part of the tubercular process involving both the colon and rectum.

Only in recent years has anorectal tuberculosis received due consideration because in the past nearly all chronic ulcers and strictures were attributed to syphilis, but with present methods of differentiating between catarrhal and specific inflammatory processes there is no longer excuse for mistaking one for the other.

Tuberculosis of the lower rectum is common, but is not encountered nearly so frequently as physicians and surgeons believe.

Anorectal tuberculosis may be *primary* (Fig. 462) or *secondary* (Fig. 464), and in the author's 100 patients treated for rectocolonic tuberculosis the disease was secondary to foci in the lungs, larynx, or pharynx in 70 per cent. of cases (see Plate VII).

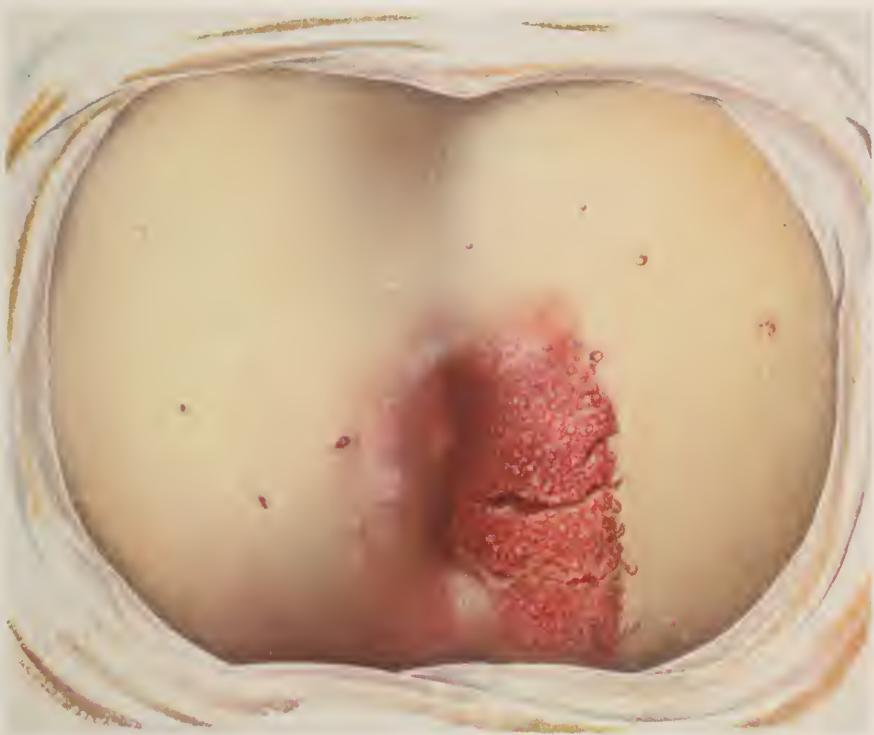
Primary is usually met with in the cecum or at the anus, while *secondary* lesions are encountered throughout the intestines, and the former is discovered proportionately more often in young children.

The reader is referred to Colonic Tuberculosis for the author's statistical table showing the frequency with which intestinal complications tuberculosis elsewhere, and the relative frequency of primary and secondary rectocolonic tuberculosis.

Both primary and secondary tuberculosis may be caused by *human* or *bovine tubercle bacilli* carried to the bowel by sputum and discharges from higher up, infected food, hematogenously or by way of the anus through using unclean toilet paper, introduction of unsterilized irrigating tubes or instruments, or scratching with infected nails.

Bovine infection not infrequently occurs in bottle-fed infants and children, but when encountered in adults is often associated with hypertrophic, neoplastic tuberculosis, which is less often

PLATE VII



Destructive rectal and perianal tuberculosis (Army Medical Museum).

met with in patients suffering from phthisis or tubercular foci elsewhere.

Tuberculosis commonly attacks the cecum, ileocecal angle, or rectum, and lesions in these localities are more extensive and typical than those of other colonic segments.

Anorectal tuberculosis may occur at any age, but is most common between the twentieth and fortieth years, in men than women, and in patients having inherited a predisposition to tuberculosis, individuals suffering from wasting diseases or syphilis—which paves the way for tubercular infection. Simple in phthisical subjects are frequently diagnosed as *tubercular* lesions because they heal slowly owing to the debilitated state of the patient. Other infectious diseases—amebic, bacillary, balantidic, helminthic, etc.—are sometimes mistaken for rectocolonic tuberculosis where the patient has a sallow complexion, is emaciated, loses considerable blood, and is troubled with persistent diarrhea and bloody or mucoid stools the result of coloproctitis.

Anorectal tuberculosis is often met with in proctologic clinics among poorly nourished individuals who live in unhygienic surroundings, and whose work is arduous and subjects them to exposure, but is less common than surgeons imply, some of whom teach that the majority of fistulae and ulcerative lesions of anorectal region are tubercular, when the reverse is true. A study of 1500 fistula subjects—500 private and 1000 dispensary—operated by the author showed sinuses were tubercular in less than 5 per cent. of *private* and not more than 10 per cent. of the *clinic* patients.

Ulcer and fistula wounds in individuals suffering from lung, throat, or prostatic tuberculosis heal slowly or not at all, owing to depletion of the patient's general health whether the *result* of tubercular or other infection.

Tuberculosis may extend to adjacent structures through the blood—*hematogenous*—which is rare, or by way of the lymphatics—*lymphogenous*—which is common, or through coalescing ulcers.

Distinctive lesions are met with in different parts of the lower bowel, and because of this the author will discuss tuberculosis of the anorectal region under the following headings:

1. Tuberculosis of the upper—movable—rectum.
2. Tuberculosis of the anal canal—fixed rectum.
3. Tuberculosis of the perianal region.

Tuberculosis of the Upper Rectum—Ampulla.—Tubercular lesions in the movable rectum (Fig. 469) excepting neoplastic are usually secondary to and continuous with those of the sigmoid flexure and colon. Ulcers are more extensive in this region than

higher up, owing to myriads of pathogenic bacteria, retention of feces with contained irritants, and trauma caused by the expulsion of accumulated firm or nodular fecal masses.

Glandular and *peritoneal* are less often associated with *rectal* than *colonic* tuberculosis. Tuberculosis of the ampulla or movable rectum is usually encountered in one of the following forms:

- | | |
|--------------------|------------------------------------|
| 1. Ulcerative. | 4. Hypertrophic (neoplastic). |
| 2. Fibrosclerotic. | 5. Miliary (general tuberculosis). |
| 3. Verrucous. | 6. Lupoid. |

Ulcerative Tuberculosis.—Tubercular ulcers in this region may be *superficial* (Fig. 464) or *deep* (Fig. 467), *single* (Fig. 463)

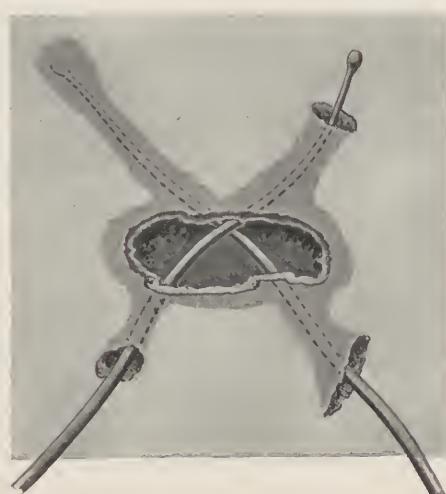


Fig. 463.—Large encircling tubercular ulcer complicated by mixed infection and formation of blind and complete fistulae into which probes have been introduced.



Fig. 464.—Ulcerative tubercular coloproctitis.

or *multiple* (Fig. 466), *small* or *large* (Fig. 467), and involve the *mucosa* superficially or undermine it (Fig. 463), and may penetrate to the *submucosa* (Fig. 463), where they are sometimes connected by *fistulous* tracts (Fig. 467).

Rectal lesions may be induced by tubercle bacilli or caused by catarrhal inflammation or specific organisms responsible for infectious proctitis in *phthisical* subjects, both of which are difficult to cure owing to the *debilitated* state of the patient resulting from tubercular foci in the lungs, intestine, or elsewhere.

Infection occurs in lymphoid or solitary follicles, overlying epithelium is displaced upward and yellowish nodules appear

(Fig. 467), which shortly undergo necrosis or caseation and form diminutive ulcers that rapidly increase in size through the formation of new tubercles that promptly disintegrate, and mixed infection is caused by pathogenic organisms—colon bacilli, streptococci, etc.—that inhabit or have accidentally gained access to the bowel. Owing to lowered resistance due to lung involvement and digestive disturbances trauma induced by feces and part played by mixed infection, ulcers rapidly multiply and greatly enlarge until the mucosa and sometimes deeper tunics are destroyed over extensive areas (Fig. 467).

As in the colon, these lesions follow blood-vessels and lymphatics partially or completely encircling the bowel (Fig. 469) and show little tendency to heal and form cicatricial tissue.

Tubercular ulceration may be confined to the mucous membrane, extend to the submucosa, causing diminutive fistulae and abscesses, or in rare cases penetrate the rectal wall (Fig. 466), and cause massive adhesions, perirectal, ischiorectal, or subcutaneous abscesses and fistulae, or peritonitis.

Tubercular ulcers may be round, oval, irregular, or serpentine in form (Fig. 464), and usually have ragged, infiltrated, or necrotic undermined borders (Fig. 468), and bulging grayish, unhealthy centers dotted by pale yellowish tubercles or caseating necrotic areas smeared with an offensive seropurulent discharge, and beneath the lesion is a deposit of fibrous tissue.

Tubercle bacilli are often difficult or impossible to discover in the discharge; microscopic and macroscopic characteristics of tissue removed from and adjacent to tubercular ulcers are numerous giant-cells, tubercles, and a protecting layer of fibrous tissue beneath lesions.

Occasionally tubercular ulceration originates in the colon or rectal ampulla, extends downward and involves the anal canal, and in rare instances the perianal skin (Fig. 467).

Hyperplastic—Neoplastic—Tuberculosis.—Neoplastic tuberculosis (Fig. 765, Vol. III) not being suspected owing to its rarity is frequently diagnosed as diverticulitis, carcinoma, sarcoma, chronic abscess or fistula. The author has operated on 9 patients suffering from this type of tubercular infection, the tumors being located as follows: *cecum 4, ascending colon 1, rectosigmoidal juncture 1, and rectum 3.*

Neoplastic tubercular tumors may be single or multiple and occur at any age and in either sex, but are usually encountered in men between the twentieth and fortieth year. The disease is induced by *bovine* or *human bacilli*, may be *primary* or *secondary*,

but is less often associated with tubercular foci in the lung or elsewhere, and develops more slowly than other types of the disease. The author has observed cases where hyperplastic tuberculosis required from six months to three years to form a tumor sufficiently large to cause obstructive or other manifestations, and in these instances diarrhea was not troublesome; there was but a moderate loss of weight, and the patient did not exhibit the usual signs of tuberculosis.

Individuals afflicted with hypertrophic tuberculosis alone or concomitant with foci elsewhere have a greater resistance than patients suffering from other and more virulent types of primary and secondary intestinal tuberculosis, which is a great aid in operative cases. These neoplasms which are sharply defined, firm, smooth, oval, or irregular in shape, fixed or slightly movable, are easily seen or palpated and may be limited to one side or involve the entire circumference of the rectum, in which case fibroplastic deposits are observed within and without the gut. These neoplasms are enmeshed in a thick elastic fibro-adipose sheath, separable from the bowel by careful dissection, and upon section tumors are resistant to the knife, grayish-white in color, resemble cartilage, and the gut wall varies in thickness from $\frac{1}{2}$ to 1 inch (12.7 mm.-2.54 cm.) or more. The involved bowel is rigid, non-collapseable, and partially or completely obstructed by the tubercular tumor.

Ordinarily mucosa is dense, pale, smooth and fixed, and devoid of tubercles, but in rare instances is ulcerated or dotted with caseating areas, or more frequently with papillomatous growths or polyps.

Neoplastic tuberculosis develops from *submucosa*, is characterized by round-cell infiltration, and the hypertrophic process extends in either direction until a tumor varying from egg to orange size or larger forms. Occasionally the mass assumes enormous proportions and is composed of neoplastic bowel exudates, adhesions, and intestinal coils welded together. This variety of intestinal tuberculosis is seldom associated with miliary deposits observed in cases of general infection.

Next to the tumor, papillomatous growths—resulting from proliferating proctitis—scattered throughout the mucosa are the chief indications of neoplastic tuberculosis, and such excrescences and larger polyps vary in number, shape and size, and have sessile or pedunculated attachments.

In this type of disease the mucosa may be thinned by atrophic changes, and the epithelial covering may disappear or change in type, becoming *stratified*. Neighboring and distant lymph-nodes less often become inflamed or infected in hyperplastic than other

types of rectal tuberculosis, but when diseased often calcify, causing no further trouble, or suppurate, terminating in abscess and fistula.

Neoplastic tumors vary in length, size, and contour, and when examined digitally or through the proctoscope their inner surface may appear smooth, covered with superficial lesions, dotted with papillomata and polyps, or in exceptional cases marked by deep necrotic crater-like ulcers, but this variety of tuberculosis is rarely complicated by troublesome hemorrhage, loss in weight, or chronic diarrhea; absorption is a frequent manifestation.

The author has extirpated the rectum three times for neoplastic tuberculosis, with 1 death and 2 recoveries. In one case the entire rectum and lower sigmoid were converted into an enormous thickened, rigid, tumor-like mass, and the patient had great difficulty in propelling feces through the occluded gut.

In the second case the ampulla was involved and infiltrates had been deposited in and outside the rectum until an enlarged, smooth, firm, elastic orange-sized tumor had formed. The mucosa was pale and smooth below, and destroyed by extensive, deep, punched-out ulcers above.

In the third case a large concave or saucer-like mass occupied the posterior half of the rectal ampulla and extended to the rectosigmoidal juncture that resembled a gumma.

In these cases the neoplasm had been diagnosed as carcinoma by other surgeons, but when sectioned and examined microscopically they were found to be hypertrophic tubercular tumors. Neither patient suffered from serious lung trouble, and it was thought the tubercular process was probably *primary* and caused by *bovine* bacilli. Repeated negative Wassermann's demonstrated the absence of syphilis.

Fibrosclerotic Tuberculosis—Gas-pipe Rectum (Fig. 765, Vol. III).—This type, like hyperplastic tuberculosis, is not often secondary to foci elsewhere and is seldom complicated by ulceration or diarrhea, and because of these peculiarities the author regards it as a modified form of the neoplastic tuberculosis.

In these cases, owing to action of tubercle bacilli and their toxins working with other pathogenic micro-organisms, a chronic or subacute inflammatory process—*stenosing proctitis*—is inaugurated in the submucosa that extends in all directions, and eventually through the formation of connective tissue converts a short or long segment of the bowel into a contracted fibrous tube—*gas-pipe rectum*. The mucosa is immobile, grayish in color, and thrown into longitudinal folds or concentric rings through

contraction of outer bowel tunics as they are converted into fibrous tissue, and not from cicatricial tissue the result of healed ulcers.

This condition, sometimes designated *atrophic* or *proliferating stenosing* tuberculosis—proctitis—has been confused with strictures resulting from healed tubercular and other extensive ulcerative lesions of the rectum. In reality this type of tubercular inflammation is not an *entity*, but a condition with unusual features that may be caused by either *ulcerative* or *hypertrophic* tuberculosis.

Miliary Tuberculosis.—This type of the disease is rare, nearly always secondary to foci elsewhere, and is seldom met with in the rectum—ampulla—except when the tubercular process has become *generalized* and other organs are involved. In such cases the omentum, intestinal peritoneum, mucosa of the bowel, and perianal



Fig. 465.—Tuberculosis cutis verrucosa (B. Trimble).

skin have a *speckled* (Fig. 768, Vol. III) appearance caused by patches of smooth or caseating white or *yellowish tinted* tubercles that subsequently undergo necrotic changes and form superficial cup-shaped ulcers.

Lesions of this type are inclined to rapidly enlarge and show slight tendency to heal when intelligently treated, owing to the exhausted and often septic state of the patient wrought by the tubercular process in the lung, intestine higher up, or another organ.

Since the microscopic and macroscopic appearance of miliary tubercular lesions of the *movable* and *fixed rectum* discussed below are the same their further consideration here is unnecessary.

Verrucous Tuberculosis.—Warty or papillomatous excrescences (Fig. 465) are occasionally met with in the perianal mucosa, skin, or both. They may be primary, but the author has not observed

them except in persons suffering from intestinal tuberculosis accompanied by an irritating discharge that bathed the anal mucosa and adjacent skin.

In one of the author's cases where verrucæ were numerous tubercle bacilli could not be discovered in the discharge or removed warts, but in other cases where vegetations were numerous bacilli and other evidences of their tubercular nature were detected.

Tubercular verrucæ involve the rectal mucosa and perianal skin, and because of their size, club shape, pinkish hue, soft consistency, and manner of attachment they have been mistaken for *condyloma acuminata*, but are seldom confused with *condyloma lata*—syphilitic warts—which tend to form large masses smeared over with an offensive discharge.

The author has observed tubercular verrucæ widely scattered over mucosa and skin in collected clusters with ulcers between their stem-like attachments, or at their bases where they had disintegrated and fallen off. Based upon macroscopic and microscopic examinations made on different occasions these warts and intervening ulcers were diagnosed as tubercular, and the breaking down of verrucæ appeared to result from caseation since tubercles were observed in their bases and edges of ulcers. When tubercular excrescences involving the skin and mucosa break down ragged ulcers sometimes form that may extend inward above the sphincter and outward involving the integument.

Tuberculosis of the Anal Canal—Fixed Rectum.—Neoplastic and fibroselerotic tuberculosis never originate in the fixed rectum, but in a case of the author's the hypertrophic process involved the upper extremity of the anal canal, and miliary tuberculosis is rare in this region except when an extenuation of perianal tuberculosis.

Lesions here parallel the long axis of the bowel, are sensitive and difficult to heal owing to their being traumatized and squeezed by contractions of the irritable sphincter and levator ani muscles.

Anal canal tubercular ulcers (Fig. 467) may be *primary* or *secondary*, and frequently it is difficult to determine whether the destructive process originated in the bowel or perianal skin, and extended upward involving the rectal mucosa. Ulcers in the anal canal are more painful than similar lesions in the movable rectum because daily traumatized by sphincteric contractions and passage of feces over them. Not infrequently fecal matter, seeds, foreign bodies, or pathogenic micro-organisms are caught in ulcerated poekets and lead to infection, and the formation of superficial or deep abscesses or fistulæ.

Rectal ulcers follow vessels, assuming a *girdle formation* (Fig.

469), but lesions located within the anal canal owing to muscular spasms appear elongated or slit-like until exposed by separating their edges, when they are seen to be irregular in shape, having a pinkish, soft base surrounded by fluted overhanging edges of mucosa (Fig. 466, A).

Anorectal ulcers in tubercular subjects may be catarrhal or caused by different types of infection and difficult to heal owing to the debilitated state of the patient, be secondary to phthisis primarily tubercular without associated foci elsewhere, or caused

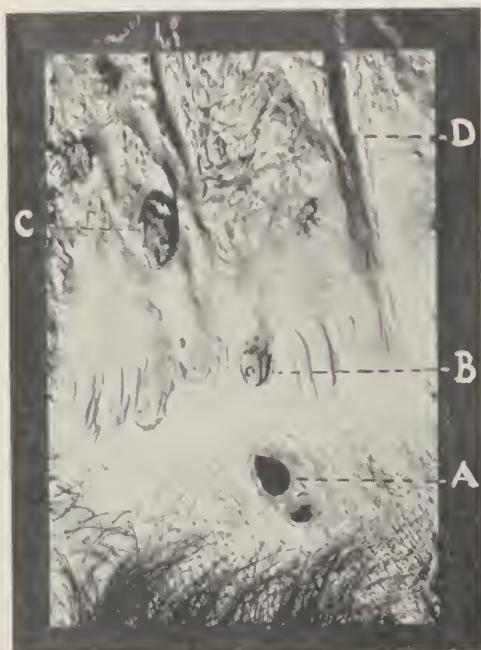


Fig. 466.—Tuberculosis of the rectum and anal canal of an adult: A, Perforating ulcer at anal margin; B, ulcerated crypt; C, large penetrating lesion; D, cicatrix from healed extensive ulcer. (Army Medical Museum.)

by mixed infection participated in by tubercle bacilli and *Entamoeba histolytica*, *Shiga baeilli*, or other specific organisms.

Extensive anorectal ulceration is common among negroes and often syphilis is frequently grafted on the tubercular process.

Tubercular lesions of the anorectal region are less painful than ulcers of similar size caused by other lesions. Anal canal tuberculosis may be limited or extend in either direction, involving the ampulla above and perianal skin below.

The *histopathology* of tuberculosis here requires no further

consideration, since it simulates the disease when located in the upper rectum.

Perianal Tuberculosis—*T. Cutis Ani*.—In this variety (Fig. 467) the tubercular process originates in or is confined to the lower $\frac{1}{2}$ inch (12.70 mm.) of the anal canal below Hilton's white line, the perianal skin, or both (Fig. 467), and induced by human or bovine tubercle bacilli. The disease may be *secondary* to foci in the lung, intestines, or elsewhere, but is *primary* here more frequently than in the rectum, colon, or small intestine.

Except when secondary to serious lesions in the lungs and colon the peritoneal, glandular, hypertrophic, and fibrosclerotic

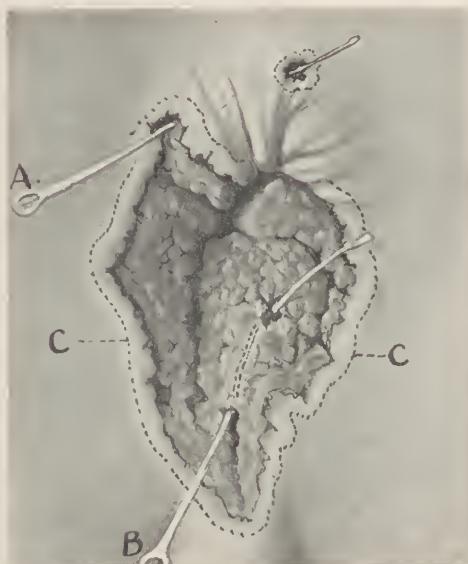


Fig. 467.—Secondary perianal tuberculosis: *A*, Probe beneath the skin; *B*, fistula passing through fat and deeper structures; *C*, extensively undermined integument.

types of the disease are rarely associated with anal tuberculosis. Once started, conditions here favor prolongation and extension of the infection because lesions are daily traumatized by contracting muscles, passage of feces during defecation, and wiping the anus with toilet paper; contiguous sebaceous and sudoriferous glands and hair-follicles provide an ideal lodging place for tubercle bacilli; lymphatics are abundant and adjacent fat offers little or no resistance to encroachment of the destructive process.

Since ulcers involving the mucosa at Hilton's white line have characteristics of those higher up already described the author will proceed to discuss tuberculosis of the perianal skin.

The author has handled 3 cases—primary 1, secondary 2—where unbroken white or yellowish tubercles were observed at or adjacent to the anus without other lesions, but in other cases studied by him diminutive, moderate, or large sized ulcers had formed before patients applied for treatment.

Most rectal lesions are slowed up or arrested at Hilton's white line (Fig. 468), but tubercular ulceration originating in the integument often involves the anal canal quickly, which indicates that disease starting in the skin is unusually *virulent* or *mixed infection* is more active in *perianal* than *rectal tuberculosis*.

In the beginning there is a tubercular dermatitis and the skin is infiltrated and of a livid reddish color (Fig. 467), or the integument is raised and marked by conglomerate masses or scat-



Fig. 468.—Primary tuberculosis of the rectum and perianal skin.

tered single unbroken or disintegrating yellowish tubercles—bird-shot size—that are easily removed intact with finger-nail or curet. These tubercles break down in spots to form characteristic tubercular lesions described below.

Tubercular ulcers of the perianal region may be superficial or deep (Fig. 467), circumscribed or scattered, and resemble rectal lesions or possess characteristics of lupus exedens (Fig. 473), and develop more insidiously when primary than secondary to phthisis or tubercular foci elsewhere. Surrounding integument may be inflamed or raised and have an uneven surface caused by tubercles (Fig. 468) which subsequently break down and form ulcers through caseation or trauma induced by clothing, walking, sitting, riding, cleansing the parts, and stretching the anus during defecation. Shortly other tubercles appear which, in turn, disintegrate, leaving

variable sized lesions that remain isolated for a time, then coalesce, to form large denuded areas involving the skin and mucosa at or above Hilton's white line (Fig. 467).

Extensive tubercular ulcers may encircle the anus or rectum, but are usually encountered anteriorly or on either side of the anus and are characterized by marked undermining of skin and mucosa (Fig. 467), beneath which is secreted a whitish, foul discharge. While they vary in appearance, depending on virulence of the infection, degree to which they are traumatized, and participation of mixed infection, perianal tubercular are sufficiently distinctive to enable one to differentiate them from other lesions encountered in the anorectal region.

Typical ulcers are irregular in shape, have a soft, raised, granulated or spongy base, and a smooth, tapering, pale reddish border or uneven, fluted, ragged or necrotic, undermined edges constantly smeared with a thin, whitish or thick, irritating mucopurulent discharge. These ulcers are not so sensitive and show less tendency to bleed than lesions of similar size induced by other types of ulceration. Tissues beneath may be soft or hardened through fibrous deposits, and occasionally a protective ring of connective tissue surrounds them which tends to slow up or arrest ulceration.

Unless promptly and intelligently treated the destructive process rapidly extends into and outside the rectum, owing to reinfection from above, the debilitated condition of the patient, and participation of other organisms, and unless arrested penetrates deeply into the bowel or skin, eventually destroys the sphincter, perforates the urethra, leads to the formation of slight or extensive rectal or perianal abscess and fistula, the discharge from which further weakens the patient.

In deplorable cases the surface of the involved area varies in appearance at several points, and there may be elongated fissures unlike superficial and deep, partially healed or angry-looking ulcers, adherent or detached, strips of skin or mucosa, necrotic spots, unbroken or caseating tubercles, fistula connecting one lesion with another (Fig. 463), and one ulcer may be almost dry and have a glazed appearance, while another is inflamed and smeared with a mucopurulent discharge, and edges of ulcers in the mucosa or integument may be smooth and rounded, but are most often jagged and overhanging (Fig. 468).

The author has treated many cases—100—embracing all types and degrees of perianal tuberculosis. In some lesions were moderate in size and showed a tendency to heal, while in others infection was virulent, extensive, and difficult or impossible to

control, and progressed until the skin over large areas, perianal muscles, and lower rectum was destroyed, and urethral, vaginal, or other fistulæ formed.

Miliary tuberculosis is rare in the perianal region, usually complicates the last stages of generalized tuberculosis, and is invariably difficult or impossible to cure owing to the patient's lowered vitality. Once well established it is difficult to differentiate miliary from other tubercular ulcerative lesions above discussed, and since the treatment of both is the same further space will not be given the subject.

Ulcerative rectal tuberculosis (Fig. 469) in the beginning causes slight discomfort, though mucous secretion is increased, but when lesions are fully developed the patient complains of loose movements, tenesmus, mucus, pus, and blood in evacuations, burning sensations, backache, shows evidences of absorption, and suffers from uneasiness or slight pain in the bowel, but when located in the anal canal they incite a constant desire to stool, cause constipation alone or alternating with diarrhea, aching



Fig. 469.—Large destructive encircling tubercular ulcers with undermined edges connected by a fistula into which a probe has been introduced.

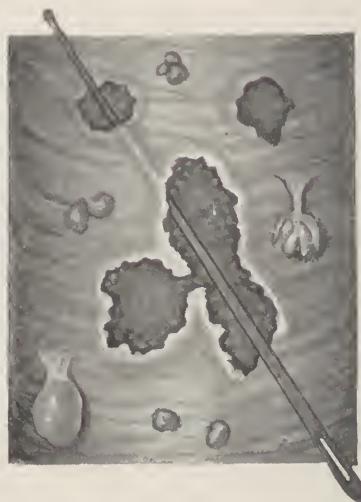


Fig. 470.—Small and large rectal tubercular ulcers, the latter formed from coalescing of several lesions. Note papillomata and polyps dotting adjacent mucosa and probe passed beneath the mucous membrane.

pains in the anal, coccygeal, and prostatic region, stinging sensation, sphincteralgia, and uncomfortable defecation.

Hypertrophic—neoplastic—rectal tuberculosis produces manifestations similar to those of other rectal tumors, causes sensations of weight and fulness, incessant desire to stool unrelieved by defecation, constipation, which later alternates with diarrhea, discom-

fort difficult to locate consequent upon nerve pressure, partial or complete incontinence, prostatic and vesical disturbances, tympanites, fecal impaction, auto-intoxication and usual symptoms of chronic, partial, or complete obstruction, and in late stages following disintegration of the mass tissue *débris*, pus, blood, and mucus in the feces which are evacuated fluid or after terrific straining when formed.

Ordinarily neoplastic tuberculosis is primary or occurs in latent or arrested cases, but when foci in the lungs or intestine are active the patient suffers from the ordinary symptoms of pulmonary tuberculosis and ulcerative coloproctitis.

Fibrosclerotic tuberculosis, being a modified form, induces about the same symptoms as hypertrophic tuberculosis, but constipation and obstructive manifestations are more troublesome, while the amount of mucus, pus, and blood in the stools are unimportant owing to the fact that the rectum through the sclerotic process without ulceration is converted into a narrow rigid tube—*gas-pipe rectum*.

Miliary tuberculosis causes profound symptoms since infection is generalized and tubercles involve different organs; they are scattered over the peritoneum, omentum, and intestine, and appear as small, whitish *specks* in ulcers located in the rectal mucosa and perianal skin. Patients thus afflicted exhibit typical manifestations of general tuberculosis as well as symptoms accompanying slight and extensive ulcerative lesions of the anorectal region.

Verrucous tuberculosis of the perianal skin is characterized by an abundant foul-smelling secretion that excoriates the integument causing soreness and pruritus. These wart-like excrescences are not sensitive and do not cause pain or other symptoms, barring the above, unless associated with other anorectal tubercular lesions.

SYMPTOMS

Manifestations vary, depending on whether the disease is *primary* or *secondary*, and according to location, duration, and complications of the infection.

When primary, the patient exhibits unimportant or no constitutional manifestations and is troubled but slightly or not at all with diarrhea and pus, blood, and mucus in the stools, but when rectal or *perianal* tuberculosis is secondary to foci in the lungs and rectum of months' standing the patient looks tubercular, exhibits a loss in weight and strength, coughs and suffers from

malaise, anemia, sallow complexion, poor appetite, concentrated urine, furred tongue, foul breath, indigestion, slight temperature, increased pulse-rate, occasional night-sweats, restlessness, nervousness, diarrhea, pus, blood, and mucus in the stools, tenesmus, abdominal pain, tenderness, and gas distention. Diarrhea, hemorrhage, and loss of weight is proportionate to the number and extent of lesions.

The above manifestations are seldom complained of by patients afflicted with primary anorectal tuberculosis except in the last stages, and lesions are deep and extensive, under which circumstances the subject may look slightly tubercular, lose some weight, and suffer from mild digestive disturbances. Tuberculosis of the *upper rectum*—ampulla—though serious never induces as much suffering as lesions of similar size and character located in the *fixed rectum*—anal canal—or at the anus, because the terminal bowel is equipped more abundantly with sensory nerves, daily traumatized by feces and squeezed by the irritable levator ani and sphincter muscles.

Symptoms induced solely by *local* tubercular lesions of the rectal and perianal regions vary with the *type of infection* causing them—*ulcerative*, *hypertrophic*, *fibrosclerotic*, *miliary*, *verrucous*, or *lupoid*.

The ulcerated form is encountered throughout the *anorectal region*, the hypertrophic and fibrosclerotic types are met with in the *ampulla*, the lupoid and warty varieties involve the *perianal region*, and the miliary type of tuberculosis, which is *generalized*, attacks the skin, rectum, intestine, peritoneum, omentum, and other organs.

Tubercular lesions involving the *skin*, *anus*, or *lower anal canal* while less sensitive than ulcers of similar size due to other types of ulceration are occasionally responsible for considerable distress. Patients thus afflicted complain of skin erosions, burning sensations, intense itching, and soiling of clothing incident to the discharge, sharp, dull, or burning pain, sphincteric spasms and discomfort induced by passage of feces over raw areas; discomfort is increased by wiping the parts with toilet paper, rubbing of clothing, walking, sitting or riding, and getting overheated, so that perspiration reaches denuded areas.

The most frequent and troublesome *complications* of anorectal tuberculosis are stricture, abscess, fistula, adhesions, and vesical disturbances, of which the first three are most important and deserve special consideration.

Having discussed the relation of ordinary and tubercular

abscess and fistula to tuberculosis of the lungs in Chapter XXV the author will not give them further consideration here.

COMPLICATIONS

Stricture.—Stenosis is a frequent complication of intestinal tuberculosis where the patient recovers, and in the author's 30 cases strictures were located as follows: *Ileum*, 2; *ileocecal angle*, 2; *transverse colon*, 1; *descending colon*, 1; *sigmoid flexure*, 2; *rectosigmoidal juncture*, 2; *upper rectum*, 10; *ampulla*, 6; *anal canal*, 2; *anus*, 2.

Multiple strictures were observed in three instances: in the *first* they were located in the rectal ampulla and sigmoid flexure; in the *second*, at the ileocecal valve and lower ileum, and in the *third* there were three stenoses—jejunum, 1; middle ileum, 1; cecum, 1. In the author's cases different types of tuberculosis, ulcerative, hypertrophic—neoplastic—and fibrosclerotic, were responsible for occlusion, the former being the most frequent.

Hyperplastic and fibrosclerotic strictures are usually *single*, *tubular*, and characterized by marked thickening of the gut wall or *tumor formation*, while *ulcerative* tubercular stenoses are more often *multiple*, *annular*, and marked by constriction of the gut at the site of healed ulcers.

From what has been said it may be inferred that tubercular strictures may be *ring-like—annular*—or involve several inches—*tubular*—of the rectum. The bowel proximal to the occlusion is dilated and the mucosa ulcerated, and the tubercular stenoses may be *partial* or *complete* and cause the usual manifestations of obstruction.

Tubercular strictures are rare at the anus, the author having seen but 2 cases, both of which resulted from the contraction of cicatricial tissue formed by the healing of ulcers involving the anal mucosa or perianal skin.

DIAGNOSIS

One suspects ulcerative lesions in the *anorectal region* as being tubercular when the patient's lungs are involved and he suffers from chronic diarrhea, particularly when ulcers tend to *encircle* the bowel (Fig. 469) and possess other characteristics previously described.

Tubercular ulcerative coloproctitis is differentiated from other infections inducing dysenteric manifestations by finding tubercle

bacilli, giant-cells, and fibrous tissue in or about diseased areas, and excluding the presence of amebæ, dysenteric bacilli, *Balantidium coli*, and other infective agents, making tubercular and Wassermann reaction tests, and examining the prostate.

Hyperplastic tuberculosis is diagnosed by locating and differentiating the neoplastic swelling from old abscess cavities, diverticulitis, chronic fecal impaction, and carcinoma, for which it is most frequently mistaken—see author's Differential Table, Chapter LXXIII, p. 61. Hyperplastic neoplasms are smooth, firm, elastic, seldom marked by ulceration, rarely complicate phthisis or coloproctitis, induce but slight diarrhea or loss of weight, and invariably cause manifestations of chronic obstruction, weight and fulness in the rectum, and incessant desire to stool.

The symptoms of **fibrosclerotic—stenosing proctitis**—are similar to those of hypertrophic tuberculosis, but differentiated from the latter by the absence of tumor formation, their narrow tube-like feel, and appearance of the involved rectum when viewed through the proctoscope.

Miliary tuberculosis is easy to recognize because of the patient's extremely debilitated condition, involvement of lungs and bowel, and finding of miliary tubercles in or near anorectal lesions.

Tubercular verrucæ resemble *condylomata acuminata* and *lata*—see Chapter XL, Venereal Diseases—induced by syphilitic gonorrhœal and leukorrhœal discharges, but when excrescences involving the mucosa or perianal skin are observed in patients suffering from tuberculosis of the lung or intestine accompanied by a discharge that oozes through the anus, a diagnosis of verrucous tuberculosis is justified with or without finding tubercle bacilli, which are difficult to discover in warts or their secretions.

The method of diagnosing *lupus* has been fully described in Chapter XLII, devoted to this affection.

TREATMENT

Anorectal ulcerative tuberculosis is difficult to control if lesions are *primary*, but when *secondary* to foci in the lungs, small and large intestine, prostate, or other organs it is nearly or quite impossible to heal them.

Anorectal heal more quickly when lesions elsewhere are quiescent, and slowly or extend when the tubercular process in the lungs or intestines is active. Routine measures are impractical and the treatment is varied to meet indications depending on duration of the disease, type of infection, and complicating tuber-

cular foci. Consequently, the treatment of tuberculosis involving the *rectum*, *anal canal*, or *perianal* skin is: (1) hygienic; (2) medicinal; (3) local; (4) surgical.

Hygienic measures, which help the local condition by building up the general health, consist in having the patient live in a healthy community with cheerful surroundings, sleep in the open air or well-ventilated room, change from a sedentary to an outdoor occupation, avoid work in the hot sun, partake abundantly of milk and nourishing food that does not leave a coarse, irritating residue; avoid swallowing sputum when suffering from pulmonary tuberculosis, dress himself coolly in summer and warmly in winter, and take little or no exercise or rest in bed during exacerbations of fever, hemorrhage, or coughing. These patients are permitted to indulge in light outdoor exercises and work, and visit properly ventilated places of amusement when the tubercular process is quiescent.

Medicinal in connection with hygienic treatment assists in controlling coughing, insomnia, nervousness, digestive disturbances, pain, cramps, diarrhea, rectal tenesmus, hemorrhage, deodorizing stools, and building up of the patient with Russell's emulsion, ʒ ss (15.0); reduced iron, gr. ij (0.12); guaiacol carbonate, gr. x (0.60); creosote, gr. j (0.06), and injections of mercury.

Fermentation, *putrefaction*, and *intestinal irritability* are relieved by one or a combination of the following antiseptic and other agents—charcoal, gr. xv (1.0); calcium, gr. xv (1.0); calomel, gr. ij (0.12), in broken doses; salol, thymol, gr. x (60); bismuth subnitrate or carbonate, gr. xx (1.30), or soda benzoate, gr. xv (1.0), administered three or four times daily until colic and diarrhea are relieved.

Pain, *cramps*, *loose movements*, *tenesmus*, *insomnia*, and *restlessness* are most satisfactorily controlled by opium pulveris, gr. iss (0.09); Dover's powder, gr. x (0.60), or morphin, gr. $\frac{1}{4}$ (0.016), administered by mouth, hypodermically, or in suppositories as required.

Diarrhea and *hemorrhage* are diminished or arrested by combining gallic acid, gr. x (0.60); tannalbin, gr. xv (1.0), or bismuth subgallate with one of the above antiseptic agents; and head and bodily *aches* are quickly relieved with empirin, gr. x (0.60), administered two or three times daily.

Sera, including Koch's old and new tuberculin, bacillary emulsions, and tubercular vaccines, may be prophylactic, but they have not benefited the author's patients afflicted with anorectal tuberculosis secondary to pulmonary and intestinal lesions.

Pain and sphincteralgia are quickly relieved by suppositories in the following combination, which also act favorably on lesions:

R. Pulv. opii.	ââ	gr. x	06;
Ext. belladonnae			
Ichthyol.		gr. xxij	15;
Oleum theobromatis.	q.s.		

M. et ft. suppositoria No. xv

Sig.—Insert one or more daily following stool or irrigation.

The accompanying ointment is also useful for the same purpose, but to a certain extent delays healing when employed frequently:

R.	Thymol iodidum	3 ss	150;
	Cocaine HCl.	gr. xvij	106;
	Ext. belladonnae.	gr. x	6;
	Balsamum peruviani.	gr. xv	10;
	Petrolatum.	3 j	300.—M.

Sig.—Use through a pile-pipe as often as required to relieve discomfort or pain.

Local treatment embracing topical applications and medicated irrigations is invaluable in the treatment of primary and secondary anorectal tubercular lesions, but better results usually follow when local is supported by general treatment as outlined above.

Enemata are useful, but irrigations are more effective for cleansing the bowel and lesions of feces, tissue débris, irritating discharges, undigested food remnants, and pathogenic organisms because a larger quantity of the medicament may be employed, since the solution runs in and out continuously through a two-way irrigator.

When colonic complicates ulcerative tubercular proctitis, irrigation of the colon from cecum to anus is necessary to fore-stall reinfection of the lower bowel when upper intestinal lesions are not healed, but where ulceration does not extend above the rectosigmoidal juncture rectal flushing is sufficient. Nearly always in enterocolitis and sometimes in tubercular coloproctitis solutions introduced from below through irrigators or soft-rubber tubes with the patient in the Sims knee-chest or inverted posture fail to reach diseased areas in upper segments of the colon, and under such circumstances Gant's *ileocecostomy*, *appendicostomy*, or *cecostomy* is performed that through-and-through colonic irrigation may be effectively carried out.

These procedures are frequently indicated, since the large intestine is usually irritated and *long colon tubes curl* in the rectum or higher up (sigmoid) following their introduction alone or through a sigmoidoscope.

Irrigations are comforting when used warm (100° F.), and distressing when employed cold (65° F.), because the latter induce enterospasm and are more effective when after filling of the colon the irrigant is permitted to escape through a self-retaining, perforated anal dilator as fast as it enters the *appendical* or *cecal* opening.

Irrigants used for colitis are employed in the treatment of ulcerative tubercular proctitis, but are used stronger, since the mucosa through which they may be absorbed is not so extensive and less fluid is retained.

Flushing is continued until the solution comes away clear, following which the patient feels relieved. The irrigant used is varied in kind and strength, depending on the duration, number and type of the lesions, amount of discharge, and degree of bleeding, being employed stronger when denuded areas are extensive and hemorrhage is troublesome.

Normal saline, boric acid, rice-water, or flaxseed tea irrigations are useful in cases of proctitis complicated by erosions and diminutive ulcers, but when lesions are numerous, large, and cause persistent diarrhea, distressing tenesmus, and a free mucopurulent or bloody discharge the author irrigates the rectum with an ichthyol, balsam of Peru, argyrol (5 per cent.), or silver nitrate, gr. v to Oij (0.32–1000.0), solution, until symptoms are modified, when strength of the irrigant is reduced one-half.

When hemorrhage is profuse the discharge is abundant, offensive, and very irritating, the rectum is washed out once or twice with silver nitrate, gr. xxx (1.95) to water Oij (1000.0), followed by a saline lavage before employing weaker solutions.

Sometimes the patient complains of burning pain, constant desire to stool, and sphincteric spasms, and then irrigations are alternated with nightly injections of the following emulsion, which is healing and lessens rectal and muscular irritability:

R.	Orthoform.....	3ij	8|0;
	Bismuth subnitratis.....	3iss	45|0;
	Olei olivæ.....	q.s. ad. Oj	500|0.—M.

Sig.—Warm, shake, and project $2\frac{1}{2}$ ounces (75.0) into the rectum at night.

Good results are also obtained from methylene-blue 1 per cent. irrigations when stimulating agents aggravate symptoms and fail to cure tubercular lesions.

When *appendicostomy* or *cecostomy* has been performed the opening is closed—in two to six months—by *fulguration* after the patient has fully recovered, and occasional irrigations *per anum* are continued for a longer time to prevent possible recurrence.

Topical applications are valuable in all types of anorectal

tuberculosis complicated by erosions or ulcers in the mucosa or skin, and are preferably made following cleansing of lesions by irrigation.

Weak are preferable to strong solutions and powders in most cases because the latter induce pain and frequently irritate and delay instead of healing ulcers. Nitric and sulphuric acid, zinc chloride, stick silver, and acid nitrate of mercury are particularly objectionable in this class of cases.

These lesions are not very sensitive, but pain is lessened by spraying the rectum with or placing a cotton pledge moistened with eucain or cocaine—8 per cent.—over lesions preceding topical treatments.

Of many agents employed, topical applications of ichthylol 25, and silver nitrate 6 to 8, balsam of Peru 50, or argyrol 25 per cent., give best results when made to lesions three times weekly. Silver preparations are effective since they form a protective coating over and hasten healing of anorectal ulcers and fissures.

In case the above agents induce discomfort or fail to produce results the author treats lesions daily with a methylene-blue 10 per cent. solution which is almost a specific in anorectal tuberculosis uncomplicated by lung or colonic foci. Powders are sometimes objectionable because they dry, cake, and irritate, but occasionally the accompanying combination allays irritation, lessens proctitis, and hastens a cure:

R. Tannic acid.....	5ss	2|0;
Bismuth subnitrate.....	5j	4|0;
Orthoform} Boric acid }.....	3j	30|0.—M.

Sig.—Insufflate the rectum and perianal region daily.

Necrotic tissue, papillomatous exerescences, and overhanging skin edges are destroyed with the curet, cautery, or, preferably, *fulguration*, which is painless and does not produce scar tissue. In a few instances where other agents failed to benefit sluggish tubercular ulcers convalescence has been quickened by fulgurating their bases and subsequently treating them with the above agents in the form of solution, powder, ointment, or suppositories.

There is but little difference in the treatment of ulcerative tubercular lesions in the skin and rectal mucosa except in the former lesions are cleansed and in the latter irrigated and dried before topical applications are made.

When supportive, hygienic, general, and local treatments fail to bring about a cure, *surgical intervention* becomes imperative.

Since *ulcers* complicating *hypertrophic, fibrosclerotic, verrucous,*

and *miliary* require the same treatment as those of the *ulcerative* type their separate discussion has been omitted.

Surgical Treatment.—Operations performed for the relief and cure of rectal and perianal tuberculosis vary with the type of infection, duration of disease, and location of lesions.

Ulcerative tuberculosis of the anorectal region may or may not require surgical intervention. In aggravated cases where ulcers have overhanging edges, uneven bases, and papillomata or polyps are interspersed about them, minor surgery, consisting of *smoothing up their borders* and surface and *excising* excrescences and polyps with knife or scissors, followed by *fulguration*, is necessary for a prompt cure.

When the operation reinforced by hygienic, medicinal, and local treatment fails to heal lesions Gant's *ileocecostomy* is required if the small and large intestine is involved, and Gant's *stab-wound appendicostomy* or *cecostomy* is indicated when the patient suffers from coloproctitis with extensive ulceration.

Occasionally in deplorable cases complicated by *gangrenous sloughing*, *numerous extensive denuded areas*, *profuse bleeding*, *exhausting diarrhea*, or *general infection*—*miliary*—it is advisable to *short-circuit* the colon—*ileosigmoidostomy* or *proctostomy*—or establish an *artificial anus* at a point above ulcers to prevent feces from entering the colon, sigmoid flexure, or rectum to provide physiologic rest for the bowel, facilitate treatment, and hasten healing of the ulcerated mucosa.

Colonic exclusion and *colostomy* accomplish the same purpose, but the former is preferable, since patients seriously object to having an *anus in the side* and the second difficult operation required to close the stoma and re-establish intestinal continuity. In deplorable cases where the bowel is riddled by the destructive process, obstructed by tubercular neoplasm or strictures at one or more points, *colectomy* or *proctectomy* must be performed to eliminate the tubercular process and give the patient an opportunity to recover.

The *hypertrophic* and *fibrosclerotic* types of rectal tuberculosis need practically the same surgical treatment, since they partially or completely block the upper rectum and seldom invade the anus.

Extirpation is the operation of choice in these cases, the rectum being extirpated by *perineal*—*inferior*—*sacral*—Kraske's *superior*—*vaginal*, or *combined*—*abdominoperineal*, *sacral*, or *vaginal*—*proctectomy*—*excision*—operations, difficult and dangerous procedures because of complicating adhesions, debilitated condition of the patient, and lengthy etherization which is dangerous in pulmonary tuberculosis.

When the neoplasm is large or fibrosclerotic, involvement is extensive, occlusion is partial or complete, the bowel is immobile, or the patient is not in condition to withstand a prolonged bloody operation, *colostomy*, though objectionable, must be substituted for *rectal excision*, otherwise death will ensue.

Occasionally where the lower rectum is occluded by hypertrophic—neoplastic—or fibrosclerotic—gas-pipe rectum—tuberculosis temporary relief is obtained by *proctotomy*, which consists in splitting the tumor or stricture and rectal wall to increase the bowel caliber, a procedure that must be repeated to relieve obstructive manifestations when occlusion recurs. The author carries the incision downward through the sphincter and out at the anus to insure free drainage. Divulsion of the occluded rectum is of no permanent benefit in this class of cases. A further description of the above-mentioned operations has been omitted here because their *technic* has been outlined in other chapters given over to this purpose.

Tubercular verrucæ are seldom benefited by medicinal treatment or topical applications, and time is not wasted with palliative measures, since they and warts are painlessly removed with scissors following infiltration of the integument to which they are attached with a $\frac{1}{8}$ of 1 per cent. eucain solution. Subsequently as diminutive warts reappear they are promptly destroyed by *fulguration*, using a graduated high-frequency spark.

Removing verrucæ with caustics or the cautery has been abandoned by the author because the procedure is unreliable, tedious, painful, and prone to leave scar tissue.

Chapter XLII

Lupus of the Perianal Skin and Rectum

THIS superficial or deeply marked destructive type of ulceration (Fig. 471) is occasionally observed in the perianal region of tubercular and patients having a poor resistance (see Plate VIII). The infection is usually primary or secondary to tubercular foci elsewhere; it is insidious, but continues to extend, and while progressing slower than other ulcerative types of tuberculosis, it eventually causes *enormous destruction* of tissue, and sometimes destroys the perianal skin over large areas, lower rectum, sphincters, urethra, or rectovaginal septum.



Fig. 471.—Lupus of the perianal region.

Other tubercular lesions are usually associated with foci in the lungs, colon, and rectum, and the patient often succumbs to the tubercular process in a few months, but lupus of the anovulvar region causes death in unhealed cases in from one to three years.

Lesions not originally so sometimes assume a *lupoid* character when mixed infection is active; they are irritated by rectal and vaginal discharges or traumatized during coitus or defecation, or by rubbing of the clothing, riding, walking, or sitting.

The author treated 6 patients—4 women and 2 men—afflicted with typical perianal lupus. In 1—twenty-eight years—the diagnosis was based upon a previous history of tubercular coloproctitis, peculiar color and other lupoid characteristics of ulcers, some of which were serpiginous (Fig. 471) in form, dotted with yellowish

diminutive tubercles, and inclined to heal at one point while breaking down through cicatricial tissue at another. This patient was seen but once and there was no opportunity to examine the discharge or tissue for tubercle bacilli and other indications of a tubercular process. In this instance there was an oblong lupoid patch 2 inches (5.08 cm.) in length and 1 inch (2.54 cm.) in width involving the left buttock and lower rectal mucosa that originated as a small round ulcer and progressed to present dimensions through the formation and coalescing of new lesions in the course of two years.

Edges of the ulcerated area were red, irregular, sharply marked, and slightly undermined at freshly invaded points, but were of

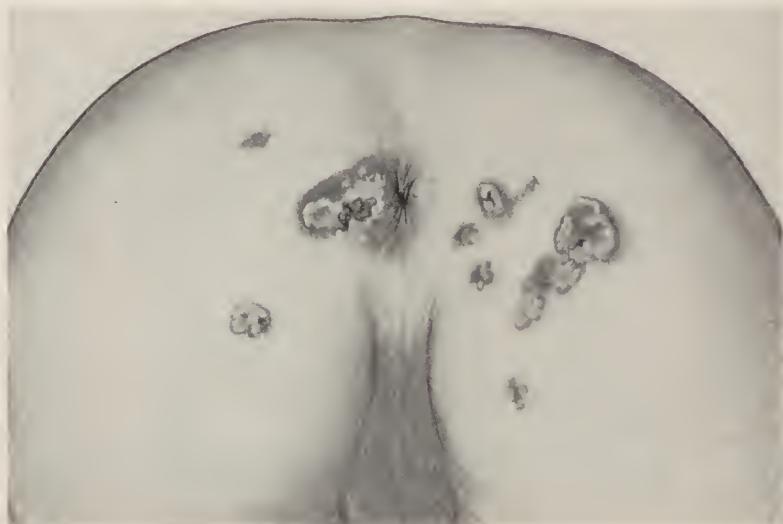


Fig. 472.—*Lupus vulgaris serpiginosus* (Trimble).

violaceous hue, indurated, shelving, and less sensitive about old ulcers, and the denuded surface here and there was marked by white cicatricial tissue or bluish scars.

Where the ulcerated process was active there was a copious, thin, seropurulent secretion, while healed and older raw areas were dry or thinly smeared with discharge that irritated surrounding skin and caused annoying itching.

These lupoid ulcers are not sensitive, induce but slight bleeding, and exhibit a tendency to undermine skin and mucosa as other types of anorectal tuberculosis, and were shallow at one and deep in another section of the denuded area.

The second case—female, forty-two years—treated by the

PLATE VIII



Perianal lupus (Army Medical Museum).

author resembled the one just described except that the patient was older, there was no evidence of *tubercular foci* elsewhere, and the lesion, which was more extensive and horseshoe-like in shape, involved the labia, surrounded the anus for a distance of 3 inches (7.62 cm.) on either side, and extended posteriorly to the coccyx.

The *diagnosis* was not difficult to make in this instance, since the parts were lupoid in appearance and tubercle bacilli, giant-cells, tubercles, and connective tissue were discovered in tissue removed from the sides and base of the ulcerated area.

In a man—fifty years—with arrested tuberculosis of the lungs operated by the author lupoid lesions were extensive and apparently originated about the external opening of a complete fistula; in 2 other cases fistulæ were present, but played no part in the causation of lupus.

Since lesions in other cases of anovulvar lupus were similar to those already discussed the author will not consider them further.

He has elsewhere¹ reported several borderline cases diagnosed as perianal tuberculosis, some of which resembled *lupus* and others *esthiomène*.

Perianal lupus is constantly confused with and often discussed under the caption of *esthiomène*, but the latter ought to be differentiated from the former by the *elephantiasic* changes (Fig. 473) that in the form of small and large hard, whitish nodules or ridges cause enormous deformity of the parts (see following chapter on Anovulvar Ulcerative Elephantiasis—*Esthiomène*).

SYMPTOMS

Manifestations of lupus simulate those of *esthiomène*. These patients may have a sallow complexion and look septic, but are not very emaciated except when perianal lupus complicates lung or intestinal tuberculosis, in which case coughing, digestive disturbances, diarrhea, pus and blood in the stools, and a rapid loss in weight is observed.

Perianal lupus induces little or no pain, but the patient suffers considerable discomfort incident to pruritus and irritation of lesions caused by feces and the abundant discharge and rubbing of the parts. These patients are not incapacitated except in late stages of the disease, but complain of the necessity of wearing a napkin to protect their clothing, and are nervous and discouraged because of the duration of the disease and failure of different remedies to arrest it.

¹ Gant, Diseases of the Rectum and Anus, pp. 343-347 (F. A. Davis Co.).

DIAGNOSIS

Since lupus in this region may be secondary to tubercular foci elsewhere, the lungs, intestine, and prostate are thoroughly examined for infected areas that might cause or complicate the condition if accompanied by a discharge. *Anovulvar epithelioma* and *ulcerative elephantiasis*—esthiomène (Figs. 473, 474)—sometimes closely resemble lupus, but the former is differentiated by finding epithelial pearls in sectioned tissue, and the latter by deformity of the parts caused by thickening and hardening of structures in the diseased area.

One is justified in making a diagnosis of lupus in the absence of a history of tuberculosis elsewhere, syphilis, chancroids, or gonorrhœa when the patient suffers from extensive perianal ulcers existing for more than eight months, the borders of which have a *violaceous hue* are shelving, and but slightly undermined edges, particularly when lesions show a tendency to heal at one point, leaving *bluish scars* as they break down at another. However, a positive diagnosis cannot be given unless syphilis has been excluded by a Wassermann, and tubercle bacilli, giant-cells, and evidence of connective-tissue condensation have been found in tissue removed from the lesion.

TREATMENT

Considerable skill and unlimited patience on the part of physician and patient are required to effect a cure in this class of cases. An effort must be made to improve the mind and physical condition of the sufferer, and increase his resistance with the aid of hygienic measures and medical agents recommended in the treatment of other types of anorectal tuberculosis. Complicating tubercular and other forms of ulcerative coloproctitis are improved by ichthyol (5 per cent.) *irrigations* and silver nitrate (6 per cent.) *applications* made to the lesions through a proctosigmoidoscope.

Local treatment includes cleansing and protecting denuded areas, and removal with scissors, knife, cautery, or by fulguration of ragged, undermined necrotic ulcer edges, excrescences, and disintegrating tissue.

Formerly the author cured, cauterized, or burned lupoid ulcers with acids or other strong chemicals, but has abandoned these procedures in favor of *fulguration* with a graduated high-frequency—violet ray—spark followed by mild applications of ichthyol, argyrol 6, or methylene-blue 10 per cent., which is soothing, healing, causes no destruction of tissue, and induces little or no pain. Resorcin in some form and an occasional treatment of

the wound with *snow*, produced with carbon dioxid, employed in conjunction with the above remedies and phototherapy—Finsen light—help in relieving or curing anovulvar lupoid lesions. The author's patients have derived marked comfort by keeping the buttocks separated with a silk handkerchief soaked in an emulsion of olive oil, bismuth, and orthoform.

Radical operation is seldom required in the treatment of anovulvar lupus owing to extent of the lesions and ineffectiveness of the procedure. When smoothing up of the edges and bases of ulcers, keeping the parts clean, and local treatment fails, the author establishes an *artificial anus*, which promptly eliminates trauma, irritation, and infection caused by defecation and soiling of the wound with feces.

The author cured a young woman aged twenty-three who for three years suffered from extensive anovulvar lupus by establishing an artificial anus and irrigating the rectum, which was ulcerated. All lesions disappeared and the opening was successfully closed at the end of *six months*, the lupus had not appeared at the end of five years, and the rectum functioned normally.

Chapter XLIII

Anovulvar Ulcerative Elephantiasis—Esthiomène

General Remarks.—This is a rare condition characterized by chronic extensive ulceration and hypertrophy of the parts, particularly the anovulvar region.

Esthiomène and *lupus exedens* were considered identical by older authorities, who believed this type of ulceration tubercular, but the author regards these as distinct conditions and will discuss them separately.

Strictly speaking, the term *esthiomène* means eating (Figs. 473, 474), which can very well be applied to this type of lesion.



Fig. 473.—Extensive ulcerative elephantiasis. Esthiomène involving vagina, labia, rectum, and perianal skin.

In addition to the slow, progressive, exceedingly destructive ulceration present in these cases the anovulvar region is enormously hypertrophied and assumes an *elephantiasic* appearance. Because of this and the deforming ulcerative process accompanying it, the author suggests the term *esthiomène* be abandoned and the expression *ulcerative elephantiasis* be substituted for it, since the latter more clearly indicates the clinical appearance of these lesions than the former.

The disease, not encountered in children, is met with more often in women than men, occurs in persons having a weakened con-

stitution, and the ulcerative hypertrophic process, which usually starts between the thirty-fifth and fiftieth year, continues for



Fig. 474.—Esthiomène and secondary elephantiasis of the vulvar and anal regions (A. Stein).

years until healed, or it causes death from exhaustion, infection, perforation, peritonitis, or other complications.

ETIOPATHOLOGY

Regarding the *etiology* of esthiomène or, preferably, ulcerative elephantiasis the author agrees with Peckam and Taylor, who maintain that this is not an *independent* affection, but an enormously destructive, ulcerating, and deforming process that originates in different types of chronic anovulvar lesions, tubercular, luetic, etc., in patients whose resistance has been greatly weakened by systemic or inherited disease.

These deforming ulcerative hypertrophic lesions have been most frequently observed in tubercular and syphilitic subjects, and have been known to start in ulcers caused by these infections, but have also originated in chancroids and anovulvar skin affections. The author believes so-called esthiomène may take its origin in any form of chronic ulceration contiguous to the anus or vulva occurring where resistance has been markedly lowered in any way. He further holds that the change from a mild to a progressive, destructive, ulcerative, and hypertrophic process is due to *mixed infection*, dribbling over the parts of an *acrid rectal* or *vaginal discharge*, and daily *traumatization* of ulcers caused by *defecation*, *wiping the anus with rough toilet paper*, *walking*, *riding*, *sitting*, and *irritation* induced by rubbing of clothing. With this understanding this condition in a series of cases could, according to its etiology, be classified as *tubercular*, *lupoid*, *syphilitic*, *gonorrhreal*, *epitheliomatous*, *chancroidal*, or *esthiomènic*, *chronic ulcerative anovulvar elephantiasis*.

The author has observed 3 typical cases—2 women and a man—who were thirty-eight, forty, and fifty-five years of age. Both women were syphilitic, as shown by luetic stigmata and repeated positive Wassermanns, one having a rectal stricture and the other luetic ulcers located on the forehead and tibia. Anovulvar lesions in both instances were very extensive and resembled those shown in Fig. 473.

In the third case—a man fifty-five years of age—deformity was enormous and included destruction of the skin for several inches about the anus from scrotum to the coccyx, the sphincter, anal canal, and structures about the membranous urethra which was exposed. In this case esthiomène was undoubtedly of tubercular origin; the diagnosis was based upon a previous history of pulmonary tuberculosis and chronic tubercular coloproctitis, and finding of tubercle bacilli and giant-cells in tissue removed from anovulvar lesions.

Anovulvar ulcerative elephantiasis originates in simple or specific lesions located in the mucosa or skin in proximity to the anus or vulva; shows little tendency to heal and a marked inclination to extend as result of mixed infection, traumatism, and dribbling over the parts of an unhealthy discharge. Esthiomènic ulcers are surrounded by *dark reddish nodules* that soften, break down, and form characteristic lesions having an unhealthy granular base, *violet hue*, irregular elevated edges, and which exude a thin seropurulent discharge.

As the disease progresses fresh nodules appear and subse-

quently disintegrate to form multiple ulcers, which coalesce, leaving a single or several extensive denuded areas separated by healthy tissue, lesions that remain superficially or penetrate deeply, destroying the sphincter, anal canal, rectovaginal septum, or perforate the rectum, with resultant abscess, ordinary fistula, peritonitis, and rectovesical, vaginal, or urethral fistula.

Months or years may be required for the progressive ulcerative process to cause serious destruction of tissue or great pain, during which time *hypertrophic, elephantiasic*—tumor forming—changes are going on that eventually cause enormous thickening and hardening—the characteristic deformity of the anovulvar region (Fig. 473).

Fibrotic edges, large and small nodules (Fig. 473), are often discernible in the diseased area, and in a case of the author's the wound on one side was dotted by fibromata from pea to olive size.

In the early stages of *tubercular* esthiomène giant-cells and tubercle bacilli are sometimes found in excised tissue, and epithelial *pearls* are observed when the ulcerative elephantiasic process has undergone epitheliomatous changes.

Many authorities consider lues the chief factor in this destructive condition, but it should not be diagnosed as syphilitic ulcerative elephantiasis unless the patient exhibits characteristic syphilitic *stigmata*, gives repeated positive Wassermanns, and the sufferer's local and general condition is improved by antisyphilitic treatment.

The enormous deformity that may result from lupoid and other *types* of so-called esthiomène is shown by McDonald's case, the most extensive yet reported. On the hips beyond the ischi were long, thin, bluish scars from healed ulcers, the anoperineal region was gone, leaving a hollow space the size of a fetal head, the urethra and mucosa between it and the cervix were healthy, the anus, rectum, and most of the vagina were destroyed, and eventually the ulcerative process extended upward to the pelvis, leaving the rectum loose and hanging like a torn coat sleeve. This patient, who performed her household duties, was unable to keep clean and eventually died from infection, diarrhea, and exhaustion.

SYMPTOMS

Pain is slight and out of proportion to extent of lesions, general health is not greatly impaired, and, as a rule, the patient is able to attend to social and business affairs, except in the last stages of virulent types of the infection. Complications occasionally en-

countered are pulmonary or rectocolonic tuberculosis, abscess, fistula, enlarged inguinal glands, hemorrhage, fatty degeneration, and perforation causing peritonitis.

DIAGNOSIS

Ulcerative elephantiasic—esthiomènic—lesions of the anovulvar region are recognized by their chronic *phagedenic* and *hypertrophic* characteristics, leading to marked *deformity* of the parts induced by ulcers that sometimes show a tendency to heal followed by breaking down of resulting cicatricial tissue and marked thickening and hardening of the involved area by the elephantiasic or fibroplastic deposits. Methods of differentiating tubercular, syphilitic, and epitheliomatous esthiomène have been previously given.

Rodent ulcer, sometimes mistaken for ulcerative anal or vulvar elephantiasis, occurs in old people, is exceedingly painful, and does not induce the kind or degree of deformity caused by different types of esthiomène or ulcerative elephantiasis.

TREATMENT

The condition is difficult to arrest or cure, but is most satisfactorily controlled by increasing the patient's resistance with improved hygiene surroundings, tonics, nourishing food, and antitubercular or syphilitic treatment when these types of infection cause or complicate the ulcerative deforming process.

The author has derived great benefit through the administration of potassium iodid, Russell's emulsion, and arsenic, particularly the eaeodylate injections.

When ulcerative coloproctitis complicates anovulvar esthiomène, colonic irrigations of ichthyol, balsam of Peru, or argyrol, 5 per cent., and topical applications of silver nitrate or ichthyol, 20 per cent., are employed, and antiseptic douches are administered when vaginal discharges irritate external parts.

Rectal and diseases of the female genitalia accompanied by an acrid discharge that in any way causes or aggravates the condition must be cured or treatment directed against the destructive process will fail.

Local treatment, which is most important, consists chiefly in (a) preventing or lessening traumatism of the parts by hardened evacuations, rubbing of clothing, walking, riding, and sitting; (b) excising overhanging edges of skin or mucosa, necrotic tissue, papillomatous excrements, and small and large fibrous nodules;

(c) *fulgurating* or making *topical applications*—silver nitrate 6, ichthyl 25 per cent., or calomel and orthoform, to superficial and deep erosions and ulcers; (d) *amputating* elephantiasic masses, and (e) establishing an *artificial anus* in deplorable cases to protect the involved area from irritating feces.

Fulguration, which is painless, leaves no scars, and is effective in these cases, is preferable to the cautery, nitric acid, zinc chlorid, or copper sulphate applications, which induce intense suffering



Fig. 475.—Elephantiasis of the rectum and vulva. Weight of tumors excised by Bulloral
10½ pounds.

and are often followed by the formation of cicatricial tissue. These lesions are usually irritable under the most favorable conditions and sometimes respond to soothing wet dressings and applications of methylene-blue, 10 per cent., hot boric acid, or an antiseptic sedative ointment composed of

R. Cocainæ hydrochloridum.....	gr. x	0|6;
Ext. belladonnaæ.....	gr. xx	1|3;
Hydrargyri chloridum mite.....	gr. xxij	1|5;
Acidum tannici.....	3 ss	2|0;
Bismuthi subnitras.....	3 j	4|0;
Adeps lanæ hydrosus.....	3 j	30|0.

M. et ft. unguentum.

Sig.—Apply at night after ulcers have been cleansed, dried, cocainized, and treated with silver nitrate, 6 per cent.

Operative Treatment.—Esthiomènic lesions heal more quickly when they are smoothed through the removal with scissors, knife, or fulguration of undermined skin or mucosa and small or massive elephantiasic nodules. Excision of the entire ulcerated area and hypertrophic lobules is tedious and sometimes dangerous owing to size of the wound left, particularly in tubercular subjects, for under such circumstances the disease may rapidly extend by way of the lymphatics unless the raw surface is sealed with Paquelin cautery.

In one case of anovulvar ulcerative elephantiasis healing responded to cleansing and treating lesions daily with methylene-blue, 10 per cent., and dressing them one night with citrine ointment—nitrate of mercury—and the next with the above salve applied on gauze.

Chapter XLIV

Venereal Diseases of the Rectum, Anus, and Perianal Region

GONORRHEA, CHANCROIDS, SYPHILIS, NON-SPECIFIC CONDYLOMATA

PROCTOLOGISTS encounter venereal disease in the anorectal region and upon the buttocks more often than is suspected by the profession or laity; yet this is not surprising when one considers the close proximity of anus and genitals, and frequency with which unnatural intercourse—pederasty—is practised (see Plate IX).

Gonorrhea, chancroids, and syphilis are the chief venereal diseases met with in the rectum and perianal region.

GONORRHEA

Gonorrhreal proctitis is increasing and not infrequently encountered by proctologists having a large private, hospital, and dispensary practice. The inflammation, which is met with among women, children, and men, is more common among Europeans and Asiatics than Americans, because more of them are pederasts. Gonorrhea is most active in the anal canal, occasionally involves the upper rectum, and rarely attacks the colon.

In gonorrhreal proctocolitis gonococci are transported to the anorectal mucosa by vaginal discharges or from the penis during coitus or pederasty, physician's finger while examining the rectum or massaging the prostate, infected hands of nursemaids, or fingers of individuals suffering from gonorrhreal urethritis or vaginitis while wiping or scratching the anus. Of 746 cases of gonorrhea in women investigated by Schmidt, 151 suffered from rectal infection.

The author has treated 20 adults—15 women and 5 men—suffering from gonorrhreal proctitis who could or would not explain how the infection occurred; handled 3 men, admitted pederasts, who contracted the disease during rectal intercourse, and had under his observation 6 children—2 boys and 4 girls—afflicted with gonorrhreal coloproctitis who were infected by nurses or governesses.

Serious pathologic changes do not result from intestinal gonorrhreal infections, but the mucosa, particularly of the lower rectum, is highly inflamed, swollen or edematous, dotted with erosions and

smeared with thick, creamy, foul-smelling pus that constantly exudes through the anus, exoriating skin and soiling clothing.

In 2 mixed infection ulcers formed, and in 5 of the author's cases abscesses and fistula were traced to gonorrhreal infection. The author also treated 2 adults—admitted passive pederasts—for extensive perirectal abscess and sloughing caused by anorectal gonorrhea.

Symptoms.—The manifestations of gonorrhreal proctitis may be slight, but usually the patient complains bitterly of uneasiness, itching, heat, fulness, and burning or stinging pain in the rectum, and later rise in temperature, constant smarting, bearing-down pain, frequent desire to evacuate the bowel, painful defecation, prolonged straining, offensive yellow discharge, discomfort while walking or sitting, occasional prolapse of mucosa and erosions in the perianal skin; the rectum is hot and sensitive to the touch, which often incites sphincteralgia; evacuations are semisolid or mushy, have an offensive odor, contain considerable pus and mucus, and induce smarting pains as evacuated.

Acute manifestations diminish or disappear in two or three weeks when there is less pus; occasionally, where infection extends to the joints or perirectal region, the patient complains of arthritis or abscesses.

Diagnosis.—Rectal gonorrhea is easily diagnosed by the acute manifestations enumerated, congested swollen mucosa as revealed through the proctoscope, and finding of gonocoeci in feces or smears taken from the bowel.

Treatment.—Gonorrhreal coloproctitis is relieved or cured by placing the patient on a light diet and keeping him quiet, securing soft evacuations, and frequently irrigating the bowel with an ichthysol, balsam of Peru, argyrol (5 per cent.), or Thiersch's solution used *hot* when there is sphincteralgia, and *cold* at other times.

When acute manifestations subside, rapid improvement follows swabbing the rectal mucosa with silver nitrate 1, or argyrol 10 per cent.; insufflating rectum with a mixture of zinc stearate 2 parts, and calomel 1 part, hastens the disappearance of erosions and lessens the discharge. Pain incident to spasm of the sphincter or levator ani muscles is frequent.

Irritation of perianal skin is allayed or prevented by zinc oxide ointment applied twice daily; difficult and painful micturition and sphincteralgia are quickly mitigated by introduction of a suppository containing morphin or cocaine, gr. $\frac{1}{8}$ (0.008), and belladonna, gr. $\frac{1}{4}$ (0.015), together with hot anal fomentations or warm injec-

PLATE IX



Destructive anovulvar syphiloma (Stein).

tions of olive oil, 3 iij (90.0), and bismuth, 3 ss (2.0), nightly; occasionally relief is to be had from sacral ice-packs.

Complicating fissures and ulcers are healed with 6 per cent. silver nitrate or ichthylol applications; condylomata are excised following infiltration of underlying integument with eucain $\frac{1}{8}$ per cent. solution. As acute symptoms subside a regular diet and exercise are permitted, but irrigations are continued until gonococci disappear from the stools.

CHANCROIDS

The author has encountered anal and perianal chancroids (Fig. 476) fifteen times concerning 3 men and 12 women. For



Fig. 476.—Case of anovulvar chancroids treated by the author.

obvious reasons these ulcers occur more often in women than men, and Fournier found that 1 in every 9 women afflicted with venereal disease suffered from anal chancroids.

Inoculation is caused by dribbling of vaginal discharges over the anus, penis coming in contact with the anal mucosa or rectum during coitus or pederasty.

Perianal chancroids are frequently associated with similar lesions on the penis or vulva, which indicates that the former is often due to uncleanliness.

The etiology of chancroids is not positively known, but many authorities claim infection is caused by Ducrey's bacillus.

The appearance of chancroids at the anus and in the perineal, vulvar, and coccygeal regions is fairly characteristic. They begin as inflamed pustules that rupture, leaving ulcers varying in size and shape (Fig. 476). Lesions here as elsewhere are multiple, superficial, have an irregular, sharply defined border, highly sensitive, pliable, grayish base that secretes a purulent discharge, are inclined to extend if not frequently cleansed, and show little tendency to burrow below the mucosa or integument.

Owing to squeezing by the sphincter or sulci between radiating skin in which chancroids are situated the lesions frequently resemble and are often mistaken for *fissure* or longitudinal erosions in the skin. Chancroidal ulcers rapidly disappear when intelligently treated; but when neglected remain indefinitely, coalesce, forming large raw areas, or become phagedenic in character and extensively destroy skin, mucosa, deeper structures of the anal, vulvar, and perianal regions, and have been known to progress until the patient died of exhaustion, or in healing extensively distort the parts through the formation of scars. Some authorities hold these lesions are the most frequent cause of *stricture* involving the lower rectum and anus.

Chancroidal ulcers are seldom encountered above the mucocutaneous juncture, but when they are, inoculation takes place during pederasty—rectal intercourse; and such lesions are less sensitive than anal chancroids, and apt to be mistaken for other types of ulceration.

Symptoms.—Chancroidal ulcers and fissures of the anus are extremely sensitive to touch, incite sphincteric spasm, induce painful defecation and constipation, and the former secrete a copious offensive discharge that constantly keeps the anal mucosa and perianal skin excoriated, which makes walking, riding, or sitting uncomfortable, and causes smarting or burning pain at the anal margin.

Rectal chancroids, in addition to the above manifestations, induce diarrhea, tenesmus, and pruritus ani, but cause less suffering than *anal* chancroids.

When chancroids are numerous and ulcers extend, causing enormous destruction of tissue, suffering is intense, the patient is exhausted from lack of rest, fecal incontinence results or cicatricial stricture forms as lesions heal, a complication accompanied by frequent straining and incomplete evacuations.

Diagnosis.—Chancroids are differentiated from chancre by rapidity with which they appear following inoculation, multiple lesions, and absence of induration. Fissure in ano and chancroids

both excite sphincteric spasm; but the former is single, located at the posterior anal margin, and does not involve the skin.

One is justified in diagnosing chancroids where lesions have the usual characteristics, and Ducrey's bacillus is found in the discharge or tissue removed from ulcers.

Treatment.—Anal chancroids like fissure in ano show little tendency to heal owing to sphincteric irritability and spasm. Lesions are inclined to extend or cause auto-inoculation, which is prevented by having the patient bathe the parts with bichlorid, carbolic acid, or an ichthyol solution, dry, and dust ulcers with equal parts of calomel, tannic acid, and zinc stearate. Ointments are contraindicated since they cause maceration of the skin and delay healing.

Some surgeons cauterize chancroids with sulphuric, nitric, or carbolic acid, copperstick or cautery—bad practice, since burning is very painful, augments sphincteric spasm, and delays healing. Suffering is avoided and better results obtained by mild stimulation, using balsam of Peru, ichthyol 20, argyrol 50, silver nitrate 8, or methylene-blue 10 per cent., which is less painful applied to lesions previously desensitized by a strong eucain or cocain, 20 per-cent., application. Equally good results are often obtained through frequent cleansing, drying, and dusting chancroids with a powder—calomel, aristol, bismuth, or soda salicylate containing an equal amount of orthoform, analgin, or anesthesin, which diminish or prevent pain incident to topical treatments.

Discomfort is lessened and healing facilitated by covering lesions with oiled silk, gauze, or old linen to avoid irritation incident to clothing, walking, etc. Success depends largely on securing daily soft evacuations and keeping the irritable sphincter in a quiescent state. Spasms of the muscle are best controlled by hot anal fomentations, hot oil bismuth injections, introduction as required of suppositories containing morphin, gr. $\frac{1}{8}$ (0.08), and belladonna, gr. $\frac{1}{4}$ (0.016), or employing the accompanying ointment:

R. Hydrarg. chlor. mit.	.....	aa 3j	4|0;
Ext. belladonna	{		
Ungt. stramonii.	.....	ad. 3j	30|0.

M. et fiat unguentum.

Sig.—Use as often as necessary through a pile-pipe.

When these agents fail to arrest sphincteralgia, divulsion or division of the muscle under eucain infiltration anesthesia is indicated, for lesions will not heal when squeezed by the sphincter. In chronic cases characterized by hypersensitive ulcers and burn-

ing pain suffering is mitigated and a cure hastened through the employment of the following:

R.	Cocainae hydrochlor.....	gr. vj	0|36;
	Ext. belladonnae.....	3ij	8|0;
	Ext. opii}.....	3j	40.—M.
	Glycerini}.....	aa	

Sig.—Apply on cotton morning and night after chancroids have been cleansed and dried.

When ulcers are undermined, overhanging mucosa and skin are excised and underlying necrotic tissue is removed. When chancroids become *phagedenic*, extend rapidly in all directions, and their progress cannot be arrested in the above manner reinforced by fulguration or cauterization, an artificial anus is formed to put the bowel at rest and enable one to keep ulcerated areas clean, otherwise topical applications avail little or nothing.

Since destruction of tissue is marked in debilitated individuals, tonics are indicated in this class of cases. Chancroids are a frequent cause of anal *stricture*, and to prevent or relieve distressing manifestations incident to stenosis establishment of a temporary or permanent artificial anus is occasionally necessary.

SYPHILIS

Lues often attacks the lower bowel, but syphilitic lesions of the anorectal region are not so common as formerly believed. Here as elsewhere the disease may be *hereditary* or *acquired*, occur in the various walks of life at different ages, and be encountered in the *primary*, *secondary*, or *tertiary* stage.

The disease is met with more frequently in women than men, owing to close proximity of vagina and anus. Infection may be contracted through an unclean toilet seat, towel, hand, or syringe nozzle, but primary anorectal lesions are usually encountered in pederasts, a type of degenerate rare in this country, but common in Europe and the far East.

Luetic rectal lesions often complicate late stages of syphilis, are more often located at or near the anus than higher up, frequently confused with tuberculosis, and usually encountered in dispensary patients.

Syphilis of the bowel may be secondary to infection of the penis, labia, lip, tongue, skin, rectum, or anus, but the initial lesion is seldom located in the lower rectum or at the anus.

The author has observed true chancre in the anorectal region six times, affecting 4 women, 1 man, and a boy. One of these patients suffered from a mixed infection and had a chancre at the anal margin, and chancroids involving the vulva and anus.

Since anorectal lues may be encountered in any stage, the subject has been considered in the following order: (a) primary, (b) secondary, and (c) tertiary lesions.

Anorectal Chancres.—*Primary*—initial—syphilitic lesions—chancres—in this region are usually located between radiating skin folds at or adjacent to the anal margin (Fig. 477), are rarely found in the anal canal, and almost never in the rectum proper.

The stage of incubation and characteristics of anal chancre are similar to those elsewhere, and lesions are single, firm, non-



Fig. 477.—Appearance of an anal chancre as seen in the author's case.

sensitive, have round, raised edges, a purplish base, and do not undermine the skin or mucosa. They cause discomfort during defecation and while walking, exude a slight non-irritating discharge, and show a tendency to heal rather than spread. Initial lesions take on *phagedenic* characteristics occasionally in individuals of unclean habits having a lowered vitality.

Mixed Infection.—The author treated a prostitute suffering from mixed infection afflicted with multiple anovulvar chancroids, and a typical hard chancre blended with a chancroidal ulcer.

Symptoms.—Highly inflamed ulcerating chancres cause considerable defecatory pain, swelling of adjacent skin folds, and accompanying discharge irritates the perianal integument, leading to the formation of papillomata—condylomata—but chancres

seldom induce acute suffering, and are most often discovered accidentally.

Diagnosis.—The diagnosis is based on the superficial character, elevated round edge, and indurated non-sensitive base of the sore, enlarged lymph-glands when the lesion is several days old, and occasional discovery of *Spirochæta pallida* in the chancre or discharge.

Treatment.—Cleansing the perianal region with antiseptic solutions, procuring semisolid stools, preventing irritation of clothing, keeping the skin dry, and applying calomel or zinc ointment containing cocaine, add greatly to the patient's comfort and favor rapid healing of the lesion.



Fig. 478.—Papular syphilids involving the perianal skin.

Sensitive and ulcerated chancres do well under topical applications of silver nitrate 6, or ichthyoil 15 per cent. Chancres within the anal canal exciting sphincteric spasms quickly cease to be troublesome following divulsion of the anal muscle, and occasional insertion of suppositories containing belladonna, gr. $\frac{1}{4}$ (0.016), morphin, gr. $\frac{1}{4}$ (0.016), and ichthyoil, gr. ij (0.12), which minimize pain and stimulate healing.

Secondary Lesions.—Individuals suffering from secondary lues may exhibit the same manifestations in the mucosa and skin of the anorectal region as in other parts of the body, whether the chancre was originally located at the anus or elsewhere—*mucous*

patches, ulcers, papular eruptions, erosions of the perianal skin, and condylomata.

Mucous patches may be single or multiple, involve the rectum or external genitals (Fig. 478); are superficial, of a reddish tint, sensitive if fissured, and exude a copious foul irritating discharge, and appear as shallow *plaque-like* (Fig. 478), irregular ulcerated or fissured areas in the skin or mucosa that often bleed; lesions that may complicate either congenital or acquired lues.

Mucous patches in the anal region promptly heal under proper treatment, but when neglected, owing to participation of mixed infection, larger and deeper lesions soon form that excite persistent sphincteritis and eventually terminate in anal stricture.

Symptoms.—Constipation from sphincteric contractions, pain during and following defecation, an acrid discharge, discomfort when walking or riding, and bloody discoloration of feces or toilet paper are the chief manifestations of mucous patches involving the lower rectum or perianal skin.

Diagnosis.—Mucous patches in the perianal skin resemble, but ought not to be mistaken for, tuberculosis; because luetic are superficial, circular, and show little tendency to undermine mucosa or integument, while tubercular lesions here are deep, destructive, ragged edged, undermined, tend to destroy the sphincter, and are characterized by an abundant thin, whitish discharge and cheesy deposits in the base and edge of ulcers.

The diagnosis is more accurate when local findings are confirmed by laboratory tests, antiluetic treatment, and discovery of spirochetes or syphilitic stigmata elsewhere.

Treatment.—Secondary luetic lesions may disappear under local treatment, but sometimes fail to heal or promptly recur unless constitutional remedies are administered—salvarsan or neosalvarsan, followed by mercurial injections or mixed treatment until syphilitic manifestations here and elsewhere have disappeared, and the patient repeatedly shows a negative Wassermann.

Mucous patches and ulcers of the anal mucosa and skin rapidly improve under calomel applications, but when the powder cakes, causing discomfort, the drug is used in an ointment:

R. Hydrarg. chlor. mit.....	gr. xij	0|8;
Ext. belladonna.....	gr. x	0|6;
Cocainæ.....	gr. vj	0|4;
Ung. petrolat.....	q.s. ad. 3j	30.0.—M.

Sig.—Apply twice daily after the parts have been cleansed and dried.

This salve is healing, soothing, and minimizes postdefecatory pain.

Occasionally topical applications of methylcene-blue 10, ichthylol 15, or balsam of Peru 25 per cent. assist in hastening a cure unless lesions are fissured and cause sphincteralgia, under which circumstances local treatment is preceded by divulsion or division of the sphincter.

Secondary Ulceration.—Luetic ulcers more extensive than mucous patches are occasionally met with in the anal canal or rectum owing to mixed infection, but are less common than most surgeons conceive. The author believes syphilis *predisposes the rectum to different inflammatory and ulcerative lesions* that are often diagnosed as luetic when there is no evidence to warrant such a conclusion other than the patient is believed to have syphilis, and often laboratory findings disprove the luetic nature of such lesions after the sufferer has undergone a prolonged antisyphilitic treatment.

Papular eruptions of the perianal skin resemble those elsewhere, but the most common type seen in the perianal region is the large flat, papular syphilitid (Fig. 478), a contagious lesion the forerunner of condylomata lata (Fig. 487), and which upon healing leaves a *copper-tinted area*.

Such lesions require local treatment when they break down and form superficial fissure-like ulcers in radiating skin folds; ulcers that quickly respond to cleanliness, stimulating applications and keeping the perianal skin dry, and covered with talcum powder containing calomel.

Perianal Erosions.—Patients suffering from mucous patches or *proctitis syphilitica* complain bitterly of *soreness* and *pruritus* incident to the acrid discharge that seeps through the anus. Raw spots from this source continue until causative inflammation and mucous patches are healed with antisyphilitic treatment, applications of white precipitate ointment, Lassar's paste without salicylic acid, ichthylol, or boric acid rectal irrigations, and applications of silver nitrate—6 per cent.—to denuded areas.

Condylomata Lata—Papillomata—Syphilitic Warts.—Luetic condylomata (Fig. 487) are frequently encountered upon the nates, in the perianal skin, and within the anus (Figs. 487, 488) of prostitutes, sodomists, and individuals suffering from rectal syphilis. Luetic warts are contagious, highly auto-inoculable, give off a foul-smelling, irritating discharge, may be encountered singly, in groups or *en masse* on one or scattered about all sides of the anus, are of a pinkish when recent, and brownish hue when of weeks' standing, and may be pointed, club-shaped, or flat in form (Fig. 487).

Condylomata lata are met with oftener in females than males, and observed most frequently in young adults, and they multiply rapidly, blending together to form small or large masses that conceal the anus, or envelop all or the entire anovulvar region (Fig. 485). New or fresh warts spring from skin coming in contact with old ones, and these, in turn, coalesce to form large, flat, spongy-looking masses.

In a case treated by the author the patient, after wiping the anus, scratched and infected the penis and moist skin between the



Fig. 479.—Serpiginous luetic secondary lesions in a man suffering from luetic colitis.

toes, which was shortly followed by the appearance of numerous syphilitic papillomata located on the glans penis and between his toes.

This type of venereal wart is caused by a syphilitic discharge that collects between radial skin folds or on the buttocks, leading to irritation when the parts get warm from exercise; frequently they are secondary manifestations of large flat luetic papules, that degenerate and exude an offensive *auto-inoculable* secretion.

Condylomata lata while common to the *secondary* may be encountered in the *tertiary* stage, and in children afflicted with congenital syphilis.

Symptoms.—The principal manifestations of syphilitic warts are offensive odor, aggravating pruritus in and outside the anus, smarting skin, discomfort while walking, and occasionally pain and bleeding during defecation, when papillomata involve the anal mucosa.

Diagnosis.—There is little excuse for mistaking luetic condylomata for other afflictions than *condylomata acuminata* induced by leukorrhea, gonorrhea, or chancroidal discharge, a type of growth common to middle-aged and elderly stout persons, whose buttocks remain in contact.

These warts have a pinkish appearance and show a tendency to coalesce and form large masses. It is safe to make a diagnosis of condylomata lata when the patient exhibits syphilitic symptoms and stigmata, suffers from rectal discharge or mucous patches, and papillomata are highly auto-inoculable and form enormous masses, giving off a copious discharge and a disgusting odor.

Treatment.—Syphilitic warts are most quickly destroyed by constantly keeping the parts dry, bathing them three times daily with bichlorid, 1 : 5000, dusting them with calomel, separating buttocks with a silk cloth, and keeping the patient quiet to prevent friction. When warts have coalesced and formed extensive masses time is not wasted with topical applications, and the author immediately *infiltrates underlying skin with eucain $\frac{1}{8}$ of 1 per cent., and excises all warts with scissors* (Figs. 487, 488), a painless procedure that requires less than ten minutes.

The operation is completed by destroying diminutive warts with a *Paquelin cautery* or *fulguration* and dusting the entire raw surface with *calomel* before applying the dressings. Antisyphilitic treatment is administered with the object of preventing recurrence, but constitutional remedies are insufficient to destroy fully developed condylomata lata.

Tertiary Lesions.—*Tertiary* anorectal gummata are encountered more frequently than *secondary* lesions, excepting mucous patches, condylomata, and occasional ulcers met with in borderline cases.

Proctitis Syphilitica.—Lues in some manner weakens the mucosa, rendering it peculiarly liable to inflammatory processes, varying from congestion to extensive ulceration.

Syphilitic proctitis renders the mucous membrane and musculature fragile so that it breaks readily into shallow or deeper cracks when the rectum is bent or distended by instrumentation or infla-

tion. Appearance of the gut in lues resembles other types of chronic ulcerative proctitis, which in sequence is characterized by congestion, erosions, and ulcers that become extensive through mixed infection.

Occasionally one encounters a luetic *proliferating* inflammatory process accompanied by hypertrophic changes in the mucosa that terminates in the formation of few or many papillomata or polyps variable in size.

Occasionally proctitis assumes a *hypertrophic* or *stenosing* character that changes the mucosa, submucosa, and musculature, converting one or several inches of the rectum into a rigid narrow tube, so-called *gas-pipe* intestine.

Atrophic proctitis is rare in syphilitic subjects, but atrophy of the perianal skin occurs, rendering it dry and parchment-like, so that it cracks easily on stretching.

Symptoms.—Manifestations of proctitis syphilitica vary with progress of the disease, and the patient complains of rectal discomfort and mucus in the *beginning*; blood-tinted or mucopurulent discharge, tenesmus, straining, and loose evacuations *later*; and then chronic diarrhea, persistent straining, foul discharge admixed with mucus and blood, excoriation of perianal skin, mucosa, and burning pains in the rectum, pruritus ani, constitutional manifestations of absorption, and occasionally fissures or mucous patches adjacent to Hilton's white line.

Diagnosis.—The symptoms of luetic proctitis simulate other specific infections of the rectum, hence the syphilitic character of lesions is determined by positive Wassermann's, finding of spirochetes, luetic stigmata, single scar caused by a chancre or rapid improvement following the inauguration of constitutional and local antisyphilitic treatment.

Treatment.—In addition to administration of salvarsan or neosalvarsan, followed by mercury and iodids, much can be accomplished through local treatment, which minimizes discomfort and heals the inflamed mucosa.

Most cases of proctitis syphilitica respond to mild stimulating sprays and soothing injections, topical applications of argyrol 10, silver nitrate 1, methylene-blue 10, ichthyol 2 per cent., procuring soft evacuations with fruit, laxatives, mineral oil, or small doses of Carlsbad or other salts, regulating the diet, contraindicating alcohol and highly seasoned foods, prohibiting violent exercise and keeping the perianal skin dry and covered with a powder composed of talcum, calomel, and zinc stearate.

Additional treatment is required when the mucosa is covered

with erosions or ulcers. In such cases warm rectal irrigations, using a solution of boric acid 4, ichthyl 3, or silver nitrate 1 per cent. morning and night, are effective.

The lower rectum and perianal skin are smeared with Lassar's paste minus salicylic acid or a salve containing calomel, gr xij (0.8); cocaine, gr. vj (0.4), to 1 ounce (30.0) of lanolin; or a zinc or yellow mercurial ointment containing gr x (0.6) of orthoform to 1 ounce (30.0) to minimize pain, prevent sphincteric spasm, and heal erosions in the mucous membrane and perianal skin incident to the acrid luetic discharge.

The treatment of proliferating and stenosing proctitis is the same as the above, except when complicated by large polyps, which

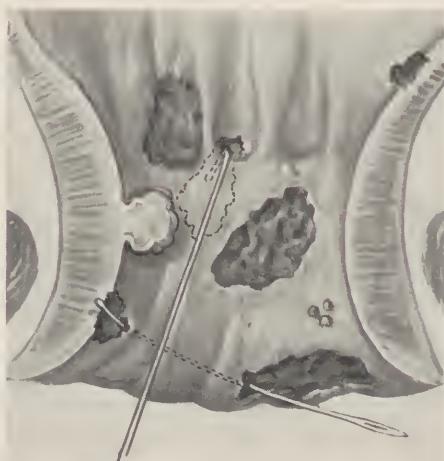


Fig. 480.—Syphilitic ulcers of the rectum and anal canal. Note depth of lesions and destruction of tissue resulting from mixed infection, large polyp on the left, fistula and three anal papillomata on the right side of anal canal above the sphincter.

are ligated and excised if low, or removed by attaching the author's valve clamps to their pedicles when high.

Diminutive and medium-sized papillomata and polyps are destroyed by fulguration or crushing them with pressure forceps having detachable handles introduced through a proctoscope and left *in situ*.

Ulceration.—Ulcers the result of luetic proctitis plus mixed infection, mucous patches, and degenerating gummata above described, may be single or multiple, large or small, superficial or deep, limited or widely scattered over the bowel, and have ragged, sharply defined, rounded, or undermined edges. When untreated, mixed infection occurs; they rapidly extend over large areas and

intercommunicating fistulæ sometimes extend from one lesion to another (Figs. 480-482).

Luetic-like tubercular lesions follow blood-vessels, causing *denuded encircling ulcers* showing a tendency to cicatrize and form single or multiple strictures. Ulceration has been observed in the different stages, but most often occurs as mucous patches or degenerating gummatæ complicating the tertiary stage, or fissures in mucosa and skin in cases of *congenital lues*.

Symptoms.—Chief indication of well-established luetic and other ulcers in the rectum are burning pain, spasm of the levator ani and sphincter muscles, offensive discharge composed of mucus, pus, blood, and *débris*; tenesmus, chronic diarrhea, persistent desire to stool, constipation, erosions in the skin, external hemorrhoids, and troublesome pruritus ani.



Fig. 481.—Phagedenic syphilitic ulceration that involved the rectum, destroyed the sphincter, caused proctodentia ani, and made extensive inroads in the skin of the perianal region.

Diagnosis.—Degenerating mucous patches are easily recognized, but it is always difficult or impossible to differentiate between extensive chronic, luetic, tubercular, balantidic, entamebic, and bacillary ulcers, except by getting the history, finding a cicatrix on genitals, observing copper-colored spots on the skin, and applying the Wassermann reaction test, which is not always reliable in late stages of syphilis.

Treatment.—The treatment of diminutive luetic ulcers is practically the same as for mucous patches and syphilitic proctitis. Large individual lesions and extensive denuded areas require a higher degree of stimulation, but are usually healed with the aid of antiseptic rectal irrigations, occasionally touching them with silver nitrate 8, ichthyol 20, or balsam of Peru 50 per cent., plus

fulguration, except when they have ragged, undermined edges, and sluggish or necrotic bases, under which circumstances overhanging edges are trimmed off and lesions are curedt or cauterized.

Divulsion or incision of the anal muscle is advisable when sphincteralgia is severe and rectal drainage poor. When the rectum is riddled by luetic ulceration, proctectomy is usually impracticable because the sigmoid is also involved in the destructive process.

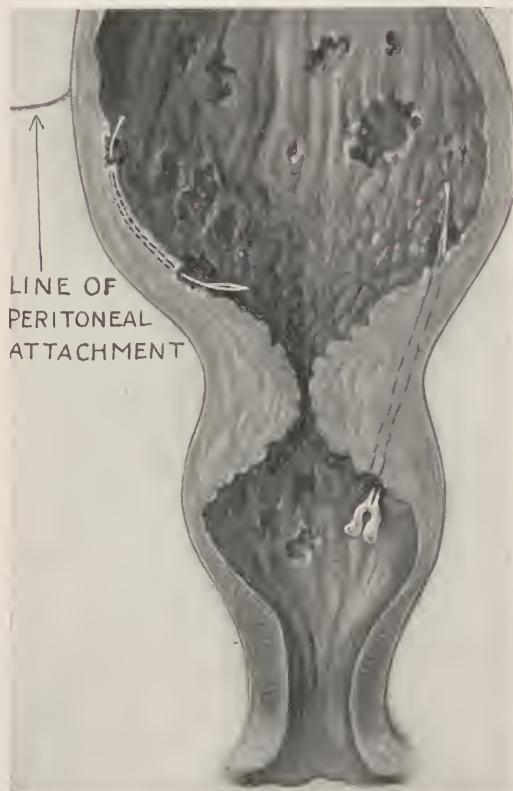


Fig. 482.—Numerous extensive luetic ulcers and stricture of the rectum. Note position of probes, one passing beneath the mucous membrane from ulcer to ulcer, and the other inserted in fistula traversing the stricture.

In such cases better results are obtained when the rectum is put completely at rest through the formation of an *artificial anus* in the sigmoid, descending colon, or higher, according to indication, following which the bowel is treated locally from above and below with medicated irrigations and topical applications, and the usual constitutional remedies are prescribed.

Stricture.—Two decades ago 75 per cent. of all rectal stric-

tures (Fig. 482) were attributed to syphilis; but advances made by proctologists have shown that lues causes rectal stenosis in approximately 10 per cent. of cases, the remainder being induced by tubercular, entamebic, balantidic, bacillary, flagellate, coccidic, gonorrhreal, or catarrhal proctitis alone or in conjunction with mixed infection. In rare instances anal and rectal strictures are the result of injuries, foreign bodies, abscesses, fistulæ, bilharzia actinomycosis, stenosing malignancy, extrarectal pressure, or formation of scars from operations.

Luetic rectal stenoses are usually single, annular, and located within reach of the finger (Fig. 482), but may be multiple or in-



Fig. 483.—Non-controllable (improperly constructed) colostomy opening made by a surgeon to relieve luetic stricture with ulceration at the rectosigmoidal juncture.

volve several inches of the gut when the bowel feels like a narrow rigid tube—gas-pipe intestine. Since the chief characteristic symptoms and diagnosis of luetic strictures closely simulate other types of stenosis, the reader is referred to Chapter XLVI in which all varieties of stricture have received full consideration.

Treatment.—The treatment of luetic stenoses, briefly stated, consists in administering salvarsan, mercury and iodids, and *divulsing* or *splitting* the stricture when obstruction is in the lower rectum; *extirpation*, *short-circuiting*, the bowel, or *colostomy* is indicated when the constriction is located in the colon, sigmoid flexure, or any point in the bowel above the peritoneal attachment. Death from *peritonitis* has frequently followed proctotomy or

stretching the gut with bougies when the block was in the upper rectum or lower sigmoid above the peritoneal reflection.

Gummata.—Gummatus deposits are encountered more often in the rectum than in the large or small intestine, and in women oftener than men; enlargements of this type are non-sensitive, may be single or multiple, circumscribed or diffuse, and involve all bowel tunics, though they invariably originate in the submucosa. Gummata must be less common than older writers believed because only a few cases have been reported in recent years, and the author has encountered the disease in but 3 instances.

Gummatus tumors originate in the submucosa, extend in both directions until small, firm, nodular, or larger saucer-shaped tumors form that project into the gut lumen or perirectal space. They remain stationary and cause constriction or degenerate, forming superficial and deep crater ulcers or abscesses and fistula in deplorable cases.

Symptoms.—Degenerating gummata present dual symptoms—manifestations of rectal stricture and ulceration—since they ulcerate and obstruct the rectum; they may also ulcerate, heal, contract, and stricture the gut.

Treatment.—Gummata sometimes disappear under antisiphilitic treatment; in the author's case, giving repeated positive Wassermanns, four gummatus masses in the rectum previously diagnosed as cancer disappeared in less than three months under mixed treatment, and there was no recurrence six years later. When tumors have broken down, lesions are treated by frequent irrigations, reinforced by topical applications, and incision and drainage of complicating fistulae and abscesses.

Small tumors may be excised, but extirpation of extensive rectal gummata is never justifiable. In deplorable cases, where the bowel is markedly occluded or extensively ulcerated, most satisfactory results are obtained by exclusion when the neoplasm is high, or formation of an artificial anus, reinforced by constitutional treatment, when the mass is in the rectum.

Anorectal Syphiloma.—Occasionally one encounters a wrinkled or lobulated rigid swelling in the rectum or perianal region of syphilitic subjects, a condition designated by Fournier as *syphiloma*. The author holds that this condition is rare in the rectum, since similar distortion of the parts may result from either stenosing proctitis syphilitica or cicatrizing gumma.

CONDYLOMATA ACUMINATA, PAPILLOMATA, VENEREAL WARTS,
VEGETATIONS

Non-syphilitic perianal verrucæ (Fig. 484) are fairly common and encountered singly or in small or large collections in close proximity to the anus, upon the buttocks, perineum, or adjacent to the vulva. They are secondary complications of gonorrhea, leukorrhea, chancroids, and other rectal affections accompanied by an acrid discharge that keeps the perianal integument and buttocks or labia moist and irritated. These growths rapidly



Fig. 484.—Condylomata acuminata—non-luetic warts scattered widely over the anovulvar region.

multiply under heat and friction, conditions favoring hypertrophic changes in the papillary skin layer.

Condylomata acuminata (Fig. 485) may occur any time, but are seen more often in persons between twenty and forty years of age, although the author has treated very old men and young children who suffered from non-luetic warts. Individuals having fat buttocks and women are more often afflicted than men.

These papillary warts are fragile, segmented, and less contagious than syphilitic condylomata, and while chiefly confined

to skin, they sometimes invade the lower rectum, where mucosa blends with integument. Occasionally vegetations are few and scattered, but more often they are grouped in large patches or enormous masses extending around the rectum (Fig. 485), or to the perineum, scrotum, vulvar, or inguinal region (Fig. 484). At first they are non-sensitive, delicate, and of a pinkish hue, but later are grayish in color, firm, and blend with adjacent warts, secreting an obnoxious, irritating discharge. Sometimes papillomata are exceedingly fragile and are broken off during defecation



Fig. 485.—Condyloma acuminata forming enormous masses that completely obscured the labia (Creadick).

or by clothing and bleed. Condylomata acuminata are composed essentially of fibrous tissue attached to a non-infiltrated base (Fig. 486), and show a tendency to form cauliflower-like growths.

Symptoms.—Venereal warts exude an abundant, offensive discharge that excoriates, causing discomfort and intolerable pruritus. When condylomata persist and mucocutaneous surfaces become fissured and ulcerated patients complain of sphincter-algia, painful defecation, and bleeding. Fresh, widely scattered vegetations cause little inconvenience while walking, sitting, or riding, but when warts surround the anus or fill the intergluteal

space exercise causes intense suffering and abundant offensive discharge.

Diagnosis.—There is no difficulty in diagnosing warts about the anus, but it is not so easy to differentiate between non-luetic and syphilitic vegetations.

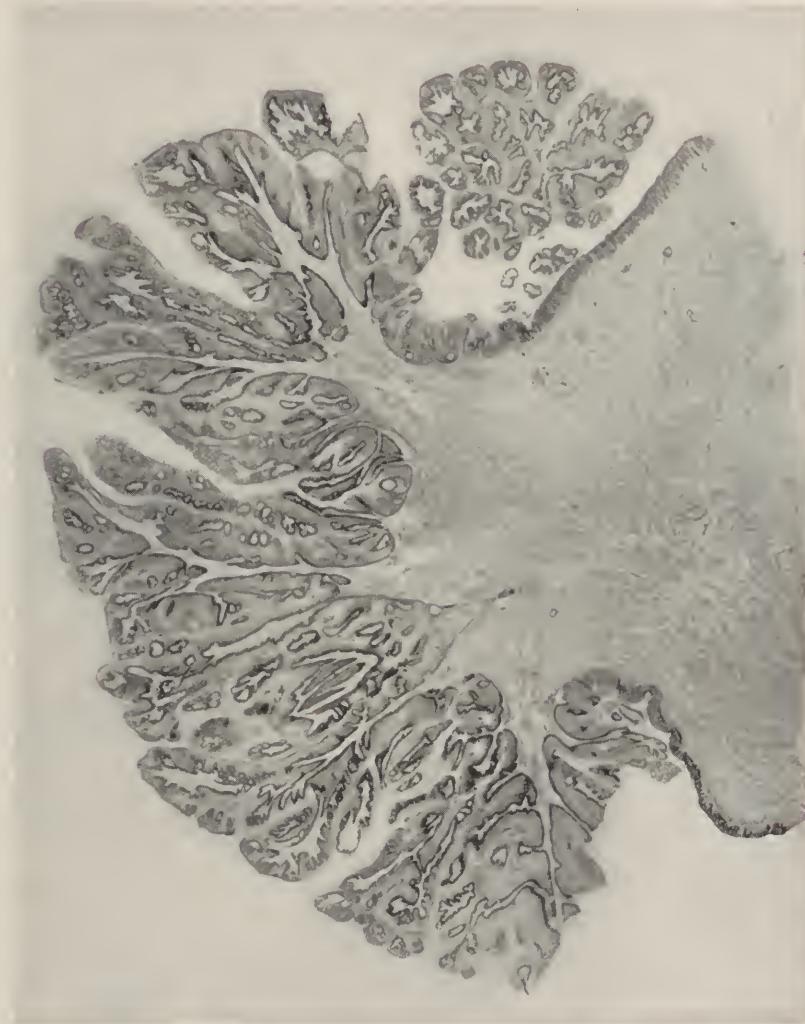


Fig. 486.—Section of condyloma ani.

Condylomata acuminata complicate *non-syphilitic* discharges, while *condylomata lata* occur in individuals giving a history of chancre and secondary or tertiary lesions, such as mucous patches,

about which these verrucae usually originate. Luetic papillomata are more offensive, very contagious, rapidly assume *mass formation* on apposing sides of the buttocks, and are more difficult to eradicate. In some instances a positive Wassermann confirms the specific nature of warts.

Treatment.—Condylomata acuminata respond less often to medication than luetic warts. Occasionally they can be made to disappear by frequent cleansing of the anus and buttocks with an astringent antiseptic solution, keeping the skin dry and covered with a powder composed of equal parts of talcum, calomel, zinc stearate, and tannic acid; securing daily soft evacuations, touching excoriated and fissured areas daily with 6 per cent. silver nitrate,



Fig. 487.—Warts being destroyed with a Paquelin cautery following anesthetization of underlying skin with eucain.



Fig. 488.—Excision of condylomata with scissors following anesthetization of underlying skin with eucain.

and frequently irrigating the rectum with ichthyol—5 per cent.—to heal rectal lesions and arrest the discharge, which is the chief cause of vegetations.

With patience one can eventually destroy warts individually with *fulguration* or *thermocautery*—painful procedures.

Operative Treatment.—Condylomata acuminata and lata can in every instance be quickly and painlessly removed (Figs. 487, 488) by infiltrating skin beneath them with a $\frac{1}{8}$ of 1 per cent. eucain solution, after which warts are rapidly excised with scissors (Fig. 488). Hemorrhage is controlled with boiling hot water gauze compresses, and the dressings are applied following dusting of the perianal region and buttocks with the above-mentioned powder.

Chapter XLV

Sodomy, Pederasty, and Rectal Onanism—Masturbation

THESE subjects are approached with diffidence because revolting, but deserve consideration on account of the frequency with which disease and injuries of the rectum and anus are caused by abnormal intercourse or rectal abuse.

Sodomy, a term employed to indicate *unnatural intercourse* between man and animal, or man and woman, where the male organ is introduced between the legs, under the arm, or into the rectum; while the caption *pederasty* is used to indicate only the improper relation between man and woman, or, more strictly speaking, man and boy, where the *penis is introduced into the rectum*; consequently in this work the discussion will be confined to pederasty.

The author has treated about 20 individuals—several men, a few boys, and an occasional woman—who admitted having indulged in pederasty for a short or long time. This type of degenerate is rare in America, but common in the far East, where rigid laws have failed to suppress it.

In the States the vice is confined chiefly to the army and navy and isolated mining and farming districts where women are scarce. Some years ago there lived in lower New York a small colony of pederasts who controlled a *Theater Comique*, where they held exclusive dances, paired off, and lived together as husband and wife. The author knows of but a single instance where parties were caught in the act, that of 2 negro boys, eighteen years old, who were convicted and sent to prison; has personal knowledge of 2 men who committed suicide when accused of pederasty by boys or their parents, and several men and boys who have been arrested and convicted for this form of sodomy.

Pederasty, *active* and *passive*, is quite common in American prisons. On one of my operating days at Sing Sing Prison my colleague, Dr. Amos Squires, prison physician, informed me that he had recently encountered anorectal chancrea in *five* convicts during one week, all of whom had been confined to the penitentiary for months or years. All chancrea were contracted from a young convict just admitted to prison, who was forced to submit to pas-

sive pederasty by older men, one of whom, having a sore on the penis, had been recently admitted to Sing Sing. Intercourse between the convicts took place in the toilet, which is the only place where they could practice pederasty.

French writers tell us professional pederasts—male prostitutes—often congregate in large numbers or walk the streets of Paris in search of persons desiring to indulge in this form of unnatural intercourse, and claim these degenerates readily recognize each other by their actions and manner of dress, the passive pederast being always *effeminate* in manner.

Tardieu examined 149 persons taken in the act, and inspected 60 other pederasts and many dead bodies of individuals upon whom the crime had been committed, and he compiled the following table, giving their age and occupation:

Age, years.	Number.	Occupation.	Number.
12 to 15	13	Servants, . . .	44
15 to 25	65	Merchants' clerks, . . .	29
25 to 35	26	Tailors, . . .	12
35 to 45	28	Military men, . . .	12
45 to 55	18	Others belonging to fifty-nine different occupations, . . .	108
65 to 75	4		
Not given	46		

Casper holds pederasts exhibit no physical signs, but Tardieu, out of 205 avowed pederasts, observed only 14 in whom it was impossible to detect a trace of the practice. In cases studied by him there were 99 passive, 18 active, 71 both passive and active pederasts, and 17 individuals who would not admit the part they practised. From a study of sexual perverts the following deductions were made concerning the effects of pederasty:

Physical Signs.—Passive pederasty produces excessive development of the buttocks, an infundibuliform appearance of the anus, relaxed sphincter, effacement of the anal folds (Fig. 489), carunculae of the orifice, incontinence of feces, ulcerations, fissures, etc.

The infundibuliform anus has generally been considered a pathognomonic sign. It is not always demonstrable, but was found 100 times in 170 cases (Fig. 489), and may be absent in persons having very fat or thin buttocks.

Tardieu believes relaxation of the sphincter to be as typical a characteristic of pederasty as the funnel-shaped anus, and observed patulous ani in 110 out of 170 cases of passive pederasts (Fig. 489).

The natural folds and creases at the mucocutaneous juncture

are effaced and the anus is smooth and polished—the *podex lœvis* of the Romans. The stretching and use of emollients to facilitate intromission induces relaxation of tissues, causing prolapse of the mucous membrane, so that in some cases it slightly resembles the labia minora.

In *active* pederasts the penis is usually very small or very large. The large penis is rare, but in all cases dimensions of the organ are excessive in one sense or the other—*i. e.*, of the organ when not in the state of erection. Its form is very characteristic; when small and thin it diminishes toward the glans, which is quite small, the penis resembling that of a dog. This is the most common shape and suggests the idea that the tendency



Fig. 489.—Funnel-shaped anus of male pederast. Note smooth appearance of perianal skin resulting from rectal intercourse.

of some individuals toward this unnatural vice may be due to an incapacity for ordinary sexual intercourse.

When the penis gets voluminous the whole organ does not taper. The glans only is elongated, and the penis is twisted upon itself, so that the meatus is directed obliquely toward the right or the left. This distortion is sometimes very marked, and appears more pronounced as dimensions of the organ increase.

It now remains to be shown how these miserable degenerates sink so low in the social scale as to become *habitués* of this abominable practice, and why the habit is formed and seldom given up. Before attempting to do this it is necessary to define active and passive pederasty. The person who introduces the male organ is called an *active*, and the one who receives it a *passive*, pederast.

The different ways by which pederasty is acquired are best described by von Krafft-Ebing.¹

Active pederasty occurs:

1. *As a non-pathologic phenomenon.*

"(a) As a means of sexual gratification in cases of great sexual desires, with enforced abstinence from sexual intercourse.

"(b) In old debauchees, who have become satiated with normal sexual intercourse and are more or less impotent, and also morally depraved individuals who resort to pederasty in order to excite their lust with this new stimulus, and aid their virility that has sunk so low physically and psychically.

"(c) Traditionally among certain barbarous races that are devoid of morality."

2. *As a pathologic phenomenon.*

"(a) Upon the basis of *congenital* contrary sexual instinct, with repugnance for sexual intercourse with women or even absolute incapability of it. But as Casper knew, pederasty under such conditions is very infrequent. The so-called urning satisfies himself with a man by means of a passive or mutual onanism or by means of coitus-like acts—coitus inter femors—and resorts to pederasty only very exceptionally, as a result of intense sexual desire, or with a low or lowered moral sense, out of a desire to please another.

"(b) On the basis of *acquired* contrary sexual instinct, as a result of long years of onanism—masturbation—which finally causes impotence for women with continuance of intense sexual desire. Also as a result of severe mental disease—senile dementia, brain softening of the insane, etc.—in which, as experience teaches, an inversion of the sexual instinct may take place."

Passive pederasty occurs:

1. *As a non-pathologic phenomenon.*

"(a) Individuals of the lowest class who having had the misfortune to be seduced in boyhood by debauchees, endured pain and disgust for the sake of money and became depraved morally; so that in more mature years they have fallen so low that they take pleasure in being male prostitutes.

(b) Under circumstances analogous to the preceding as a remuneration to another for having allowed active pederasty."

2. *As a pathologic phenomenon.*

"(a) In individuals affected with contrary sexual instinct, with endurance of pain and disgust as a return to men for the bestowal of sexual favors.

¹Psychopathia Sexualis, Krafft-Ebing (Chaddock), American, from seventh German edition, p. 426, 1893.

"(b) In urnings who feel toward men like women, out of desire and lust. In such effeminate men there is a *horror feminæ*, and absolute incapability for sexual intercourse with women. Their character and inclinations are feminine."

This classification is said to include all the empiric facts that have been gathered by legal medicine and psychiatry.

With this understanding of how these degenerates have become pederasts the author will discuss diseases of the anorectal region resulting from this practice, which are many and varied, since pederasts may contract in the anorectal region all diseases common to the genitals of the ordinary female prostitute.

Any one of the following pathologic conditions may be contracted through intercourse *per rectum*, some due to direct contact, others to secondary infection:

- | | |
|------------------|-----------------------------------|
| 1. Hard chancre. | 7. Condylomata lata or acuminata. |
| 2. Chancroids. | 8. Fistula. |
| 3. Proctitis. | 9. Lacerations and abrasions. |
| 4. Ulceration. | 10. Fecal incontinence. |
| 5. Fissure. | 11. Ecchymoses. |
| 6. Abscesses. | 12. Deformity of the anus. |
| | 13. Procidentia ani. |

The author has treated the following diseases and injuries of the anus and rectum in patients who admitted having indulged in rectal intercourse: Chances 2, chancroids 4, gonorrhea 7, abscesses 3—gonorrhreal 2, ordinary 1—fistula 1, anal fissures 2, infundibuliform anus with partial incontinence 1, ecchymoses 1, condylomata 5, syphilitic 2, gonorrhreal 3, and complete laceration of the sphincter 1. He has also treated several other individuals for anorectal affections whom he suspected of indulging in passive pederasty and operated on a young girl for extensive tear through the rectovaginal septum deliberately made by a drunken man who forced the penis into the anus and through the vaginal wall because he caught her talking with another man.

Since the *symptoms*, *diagnosis*, and *treatment* of anorectal affections incident to pederasty are the same as those resulting from other causes outlined elsewhere their further discussion has been omitted.

RECTAL ONANISM, MASTURBATION

Rectal *masturbation* is sometimes resorted to by those who for various reasons are not permitted to have normal intercourse. It is more frequently practised, however, by men who have lost

their sexual power and cannot obtain satisfaction in the natural way, as occurred in 3 of the author's cases. That sexual *orgasm* may be excited in this way there is little doubt, for if such were not the case these degenerates would not submit to the pain and disgust that at first must accompany the act, and it is a fact that when the habit has been contracted its victims seldom have sufficient will-power to stop it.

That sexual gratification is obtained through this practice and pederasty is shown by the actions of many passive pederasts who are neither *forced* nor *paid* to submit to the active party, but who, on the contrary, seek those who will satisfy their lust though they must recompense them.

The fingers, candles, bottles, walking sticks, rectal bougies, and other lengthy smooth objects easily introduced into the rectum are usually employed to excite sexual orgasm by persons who indulge in rectal masturbation. (See chapters on Foreign Bodies of the Colon and Rectum.)

There are many pathologic conditions that may be produced in and about the rectum by this practice. The most common pathologic lesions occurring in the anorectal region the result of rectal onanism are: ecchymoses, injuries to the mucous membrane, weakening or destruction of the sphincter muscle, prolapsus ani, fissures, ulceration, and proctitis. In old *habitués* the mucosa through incident ulceration or inflammation assumes a thickened, glistening, and parchment-like appearance.

For the treatment of these conditions the reader is referred to other chapters where they have received due consideration.

Chapter XLVI

Anorectal Stricture—Stenosis

General Remarks.—Any condition that diminishes the lumen of the rectum or anal canal might properly be designated as stricture, because the caliber of the bowel may be reduced by constriction or pressure from without, projection of inflammatory and fibrous deposits or tumors within, or both.

Some authorities claim strictures are of frequent occurrence, but the author holds the opposite view, since not more than 2 per cent. of his rectal cases have suffered from this affection.

Anorectal strictures may be *high* or *low*, but 80 per cent. are within 3 inches (7.62 cm.) of the anus, the majority being located at or a short distance above the upper extremity of the anal canal.

Stricture in this region may be *congenital* (sec Chapter VII) or *acquired* (Fig. 49), encountered in either sex, but occurs in women more often in ratio of 3 : 2, is met with in all races, most frequently among negroes, many of whom are afflicted with tuberculosis, syphilis, or both, and have a lowered resistance that renders them an easy prey to infection and ulceration. Stricture is common to all climates, but predominates in tropical countries where entamebic and bacillary colitis prevail, and is encountered in the well-to-do about as frequently as the laboring classes.

Anorectal stenoses may also be *benign* or *malignant*, *single* or *multiple* (Figs. 490, 491), *annular*—short or ring-like (Fig. 493)—*tubular*—long (Fig. 491)—*valvular*—shelf-like, or diaphragmatic—*linear*—longitudinal—or *tortuous*—snake-like—*permanent* or *spasmodic*, and induce slight obstipation, partial obstruction, or completely block the bowel.

ETIOLOGY

The *anatomic arrangement* and *function* of the rectum are conducive to stricture because the rectal valves, narrow anal canal, and irritable character of the levator ani and sphincter muscles frequently resist passage of the feces, which, in turn, is followed by trauma of mucosa during defecation, and local inflammation or infection ensues, which if neglected terminates in the formation of contracting cicatrices or narrowing of the gut by inflammatory deposits.

The chief *predisposing* and *exciting causes* of rectal stricture are constipation, inflammatory and ulcerative lesions in the mucosa, pelvic disease, prostatic enlargement, vesical calculi, injuries incident to labor, uterine displacements, prolonged use of pessaries, anterior coccygeal displacement, sacrococcygeal tumors, submucous fistulæ, encysted foreign bodies, diverticula and anorectal, pelvic, uterine, vaginal, vesical, prostatic, urethral, perineal, and coccygeal operations, accidental injuries, and sloughing from any cause.

CLASSIFICATION

Strictures of the anorectal region for convenience of description may be classified as:

- | | |
|-----------------|-----------------------------|
| 1. Congenital. | 5. Traumatic. |
| 2. Phantom. | Gonorrhreal. |
| 3. Spasmodic. | 6. Venereal { Chancreoidal. |
| | { Syphilitic. |
| 4. Inflammatory | 7. Hemorrhoidal. |
| | 8. Valvular. |
| | 9. Extrarectal. |
| | 10. Neoplastic. |
| | 11. Miscellaneous. |
- Catarrhal.
Tubercular.
Entamebic.
Bacillary.
Balantidic.
Diphtheric.

Congenital Stricture.—Stenosis of the anus has been observed in newborn syphilitic babies, but congenital anorectal stricture (see Chapter XLV) is usually due to malformation of the anus or rectum wherein caliber of the anal canal or bowel is too narrow or obstructed by a fibrous band, membranous partition, or ending of the rectum in a blind pouch, for examples of which see chapter on Anorectal Congenital Anomalies.

Many troublesome stenoses in children and adults are traceable to operations performed for the relief of anorectal congenital defects.

Phantom Stricture.—Older writers on rectal diseases devoted considerable space to phantom or strictures that could be detected with the finger at one time and not at another. Modern proctologists ignore this type of stenosis, since they have learned that so-called phantom strictures are due to irritability of the *sphincter* or *levator ani* muscles, that upon examination were contracted in one instance and relaxed in another or mistaken for the *rectal valves* which change their location upon straining or drawing the pelvic outlet upward.

Spasmodic Stricture.—This is the most common type of stric-

ture and may be caused by spastic contraction of the musculature of the rectal wall (rare) or spasms of the sphincter or levator ani muscle (frequent).

Clonic or tonic contraction of the muscular tunic or muscles may be incited by cryptitis, hypertrophied anal papillæ, protruding, internal thrombotic or inflamed, external hemorrhoids, blind internal fistula, encysted foreign body, fissure, polyps, ulcer, epithelioma or acutely inflamed mucosa, and be continuous or interrupted, causing partial or complete obstruction.

Spasmodic stricture in the lower rectum has also been incited by worms, acrid discharges, collections of mucus, detached foreign bodies, fracture of the coccyx, and diseased structures adjacent to the anal canal and skin lesions encroaching upon the anus. Temporary or strictures of this class fortunately are easy to relieve because conditions responsible for them are readily eliminated by treatment or operation, whereupon the irritability and muscular spasms cease.

Traumatic Stricture.—Trauma plus infection (Fig. 494) is responsible for a fair percentage of permanent strictures. Injuries leading to distressing stenoses in the anorectal region may be trivial or extensive. Wounds here are inclined to chronicity, throwing out blocking exudates or formation of cicatricial tissue because of daily irritation caused by stretching during defecation, infection by micro-organisms, lodging within them of feces, foreign bodies, acrid discharges, and to trauma induced by spasms of the levator ani or sphincter muscle.

The author has treated many cases of deplorable rectal stricture complicated by abscess, fistula, general infection, or intestinal obstruction traceable to neglected slight injuries and minor operations, and observed dozens of slight or serious stenoses in lower rectum caused by the *unwarrantable* Whitehead operation for hemorrhoids.

Anal strictures occasionally follow the ligature, clamp and cautery, and modified excision operations for hemorrhoids performed by inexperienced surgeons, who remove an unnecessary amount of perianal integument. Slight or troublesome stenoses may be secondary to rectal extirpation, plastic operations for deplorable or complete procidentia, high-lying perirectal abscesses, extensive or horseshoe fistula (Fig. 494), and other radical procedures necessitating removal of large areas of the mucosa or skin and those complicated by infection, retraction of the gut, or delayed healing.

Another frequent cause of anorectal stricture is the carbolic

acid injection treatment of hemorrhoids, which is often followed by sloughing and formation of scar tissue at or near the anus.

Briefly stated, the following are the causes most frequently responsible for traumatic stricture as observed in the author's private, clinic, and hospital practice: scalding by enemata and irrigations, faulty introduction and breaking enema tubes, pederasty, careless instrumentation, stretching the sphincter or divulsing anal canal with fingers, bougies, or metal dilators, exploration of rectum with the hand, miscellaneous operations upon rectum, urethra, vagina, and prostate, burning tissues with acids, caustics, or the cautery, extravasation of urine from perforated or ruptured urethra, sloughing from pessaries and extensive wounds of the rectum and anus incident to foreign bodies, labor, falling upon or being struck with sharp or ragged objects, pneumatic distention of the bowel, forcible introduction of the sigmoidoscope, necrosis from infiltration of tissues with quinin and urea, and stab, gunshot, shell, and shrapnel injuries.

Inflammatory Stricture.—The majority of rectal strictures are the result of inflammatory and ulcerative lesions involving the mucosa or deeper tunics, particularly the submucous coat.

Catarrhal, tubercular, entamebic, bacillary, balantidic, and syphilitic proctitis are often responsible for inflammatory stricture, and this type of stenosis has in rare instances been induced by gonorrhreal and diphtheric (Fig. 492) infection of the lower bowel.

Catarrhal Stricture.—Catarrhal coloproctitis (Fig. 496) is a common ailment in and about New York, and the inflammation may be *acute* or *chronic*, but the former seldom terminates in stricture. Catarrh of the colon and rectum may be induced by infection, gastro-intestinal dyspepsia, trauma, exposure, gourmandizing, alcoholism, daily cathartics, contaminated water, mechanical irritants, constipation, fecal impaction, extension of disease from other structures; extreme heat, internal medication and irrigants, dietary indiscretions, general infectious diseases, and miscellaneous causes.

Catarrhal stricture is of more frequent occurrence than the profession appreciates, and in many instances with aid of the proctoscope the author has been able to follow the inflammatory process from its incipiency, where the mucosa appeared slightly congested to the terminal stage marked by partial or complete rectal obstruction.

The author has elsewhere¹ considered the pathology of catarrhal proctitis and will refrain from a detailed discussion here. En-

¹ Gant, Diarrheal, Inflammatory, and Parasitic Intestinal Diseases, pp. 181-185.

gorgement of the mucosa, mucous evacuations, is in time followed by destruction of the epithelium and formation of few or many erosions or superficial ulcers and extension of the inflammatory process to the submucosa.

Once ulcers are present they are inclined to extend, the result of mixed infection, until large and numerous, and when healed form cicatricial tissue that diminishes the bowel lumen slightly or to a marked degree.

Destruction of continuity of the mucosa is not essential to the formation of rectal stricture incident to chronic catarrhal proctitis, for the inflammatory process starting superficially frequently extends to the submucosa or deeper, causing a plastic deposit that gradually changes into fibrous tissue with or without transformation of cylindric into striated pavement epithelium. Collections of dense connective tissue thus formed may be ring-like or extend along blood- or lymph-vessels of the submucosa and eventually convert the rectum into a rigid tube—*gas-pipe* rectum.

Authorities on rectal disease have written *in extenso*, endeavoring to differentiate between the pathology of strictures without success, because the stenosing, inflammatory, or ulcerating process of catarrhal, tubercular, syphilitic, and entamebic proctitis differ but slightly from a histopathologic viewpoint, but show a preference for certain segments of the colon and rectum.

Tubercular Stricture.—Rectocolonic tuberculosis (Fig. 492) rarely terminates in stricture because the disease is usually secondary to pulmonary lesions, resistance is low, and one is seldom able to heal anorectal tubercular ulcers with supportive measures reinforced by local treatment. Tubercular strictures may be classified as *ulcerative*, *hypertrophic*, and *fibrosclerotic*, which may be *annular*, *neoplastic*, or *tubular* in form.

Tubercular ulcers resulting in stricture may be *primary* or *secondary*, and are often complicated by fistula and destruction of the perianal skin. The majority of stenoses resulting from ulceration are low down, and patients thus afflicted exhibit characteristics of the tubercular subject, complain of diarrhea and rectal discharge containing mucus, pus, and blood; occasionally tubercle bacilli are detected in the stools.

Hyperplastic—*hypertrophic*—*neoplastic*—intestinal tuberculosis (Fig. 490) is nearly always encountered in the cecum or rectum, the former being the most frequent location.

This type of tuberculosis may be primary or secondary, caused by human or bovine tubercle bacilli, progresses very slowly, and except in the later stages following degeneration of the tumor is

seldom complicated by pulmonary disturbances, ulceration, or diarrhea.

In 3 cases observed by the author, previously diagnosed as cancer, the neoplasms required from two to five years to develop and seriously blocked the rectum, and these patients until the later stages did not look tubercular or suffer a marked loss in weight.

Hypertrophic tuberculosis seldom produces annular or tubular stricture, but causes partial or complete obstruction through encroachment of the tumor upon the bowel lumen. In these cases infection centers in the submucosa, causing progressive throwing out of *intra-* and *extrarectal* plastic deposits that undergo *fibrotic*



Fig. 490.—Neoplastic tubercular stricture involving entire rectum. Note enormously thickened rectal wall and cicatrices affecting the mucosa.

changes resulting in conversion of the rectal wall into connective tissue from which ovoid swellings project into and outside the bowel.

Fully developed neoplastic, tubercular tumors are egg shaped, elastic, dense, fixed, and surrounded by a sheath resembling that covering the kidney. In successive stages the tumor mass induces constipation, costiveness, alternating with diarrhea, persistent loose movements, straining during and after stool, sensations of weight and fulness, and finally a blood-tinged mucopurulent discharge when through obstruction to the circulation the neoplasm degenerates, and superficial or crater-like ulcers form.

Good results follow peeling out of rectal tubercular neoplasms, but occasionally, owing to size of the mass and resisting adhesions, extirpation is impossible. Under such circumstances a controllable artificial anus is indicated.

Fibrosclerotic tubercular stenoses are rare and characterized by conversion of the submucosa and musculature into a rigid tube—gas-pipe intestine—with or without serious involvement of the mucosa. Strictures of this type are tubular, several inches in length (Fig. 490), and the result of so-called *stenosing proctitis*, incited, aggravated, or prolonged by virulent, irritative bacterial toxins. Introduction of the finger is impossible, the stools are tape- or pencil-like, and the bowel is rarely completely emptied owing to the long, narrow, rigid tube through which feces are evacuated.

Fibrosclerotic rectal strictures are difficult or impossible to extirpate because of their length and dense adhesions that immobilize and bind the bowel to adjacent structures, hence colostomy is often required to relieve obstruction and afford the patient an opportunity to regain his health.

In conclusion, it may be stated that cases of tubercular stricture complicated by destructive lung lesions and extensive perirectal fistula and abscess are hopeless.

Amebic Strictures.—In neglected cases of amebiasis (Fig. 491)—dysentery—colonic and rectal stricture is an occasional complication. Stenoses from this infection may be single or multiple, are more often high than low, and caused by cicatricial tissue from healed large or small denuded areas, the result of chronic ulceration or sloughing that occurred shortly following inauguration of the dysenteric attack; amebasic occlusions are usually of the annular type.

Bacillary Stricture.—Rectal and intestinal stenoses the result of infection (Fig. 490) caused by Shiga's, Flexner-Harris, and other so-called dysenteric bacilli (Fig. 718), are often inexcusable because bacillary colitis can be arrested by sera before ulceration occurs sufficiently to cause obstruction of the gut lumen through the formation of scar tissue. Except by getting a complete history it is impossible to differentiate between chronic, entamebic, and bacillary strictures, because of the similar characteristics and disappearance from the stools of entamebae and bacilli.

Balantidic Strictures.—Balantidic rectocolonic infection (Fig. 732) is said to have caused stricture, but the author has never observed this variety of anorectal stenosis and believes that obstructions supposedly resulting from balantidic lesions are, in reality,

due to ulcers caused by *Entamoeba histolytica* or *Shiga bacilli* plus mixed infection.

Diphtheric Stricture.—The author has treated 3 cases of deplorable true diphtheric rectal ulceration associated with Klebs-Löffler nasopharyngeal infection, and has observed only one rectal stricture induced by diphtheria (Fig. 492).

Venereal Stricture.—Owing to close proximity of the anus to the genital organs, venereal disease—*gonorrhea*, *chancroids* or *syphilis* of the anorectal region—that terminates in slight or serious stricture is fairly common.

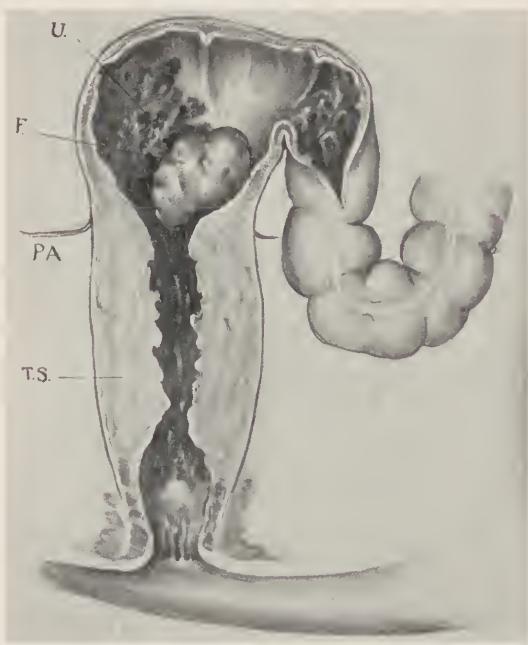


Fig. 491.—Amebic tubular stricture complicated by ulceration and fecal impaction: *U*, Ulceration; *F*, fecal mass; *P.A.*, peritoneal attachment; *T.S.*, tubular stricture—gas-pipe rectum.

Gonorrhreal Stricture.—Gonorrhreal proctitis is occasionally encountered in infants, children, and adults. Infection highly inflames the mucosa, causes burning pains, is characterized by an abundant, thick, yellowish malodorous discharge, and may continue a few days, weeks, or months, during which time the mucosa is swollen or edematous and dotted over with erosions. The author has seen but one rectal stricture he attributed to gonorrhea, and few cases of gonorrhreal stenosis have been recorded.

Chancroidal Stricture.—The author almost yearly encounters

anal chancroids in his private, hospital, or clinic work, and several times has known them to cause stenosis.

In the acute stage chancroids are responsible for spasmodic stricture—sphincteric and levator ani—and in neglected cases with or without phagadena they are responsible for the formation of considerable cicatricial tissue.

This type of infection is located at the anus or within the anal canal, and causes multiple lesions that destroy considerable perianal skin and rectal mucosa. A large percentage of anal stenoses not caused by Whitehead's operation are the result of chancroidal infection.



Fig. 492.—Cicatrices resulting from healed diphtheric ulcers.

Syphilitic Stricture.—Luetic rectal stenoses may complicate congenital or acquired syphilis (Fig. 493), but the latter is usually responsible for the condition. Lues may directly or indirectly induce constriction of the bowel, in the *first*, through destructive lesions, and in the *second* place by lowering the patient's resistance and causing endarteritis, conditions favoring the formation of destructive ulcers or fibrous deposits where the mucosa is traumatized.

Authorities of three or four decades ago held that from 50 to 80 per cent. of strictures were syphilitic, but proctologists with modern diagnostic technic and aid of the proctoscope have demonstrated that comparatively few, not more than 10 per cent., of

anorectal constrictions are due to lues. Many physicians and surgeons are accustomed to diagnose rectal affections as tubercular or syphilitic unless it is obvious they suffer from some other disease, which accounts for mistaken diagnoses regarding rectal stricture.

Chancre in the absence of mixed infection is never responsible for anal constriction, but anorectal stricture has been induced by *proctitis syphilitica*, secondary ulcerative lesions in mucosa or skin—mucous patches—deep congenital anal fissures and gummata, but extensive ulceration plus mixed infection is most frequently responsible for the stenosis.

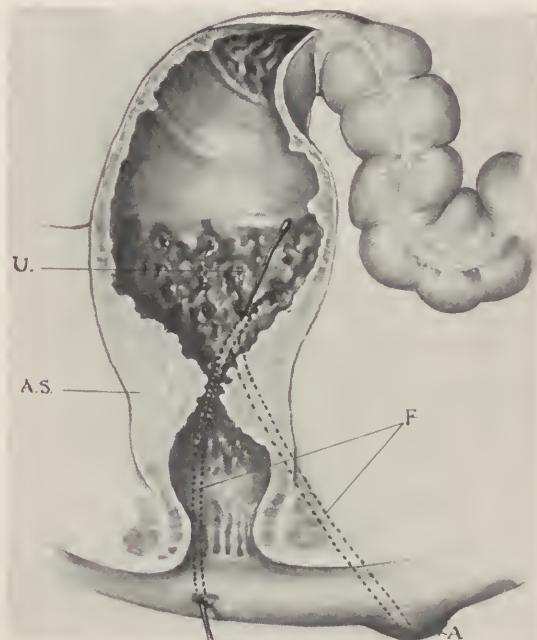


Fig. 493.—Syphilitic annular stricture complicated by extensive ulceration: U, Ulceration; A.S., annular stricture; F, fistulae.

Proctitis syphilitica renders the mucosa and musculature brittle, causing the bowel to break from slight trauma or tension, and ulcers form which multiply and extend through mixed infection; as result of the inflammatory process or healed ulcers the bowel lumen is diminished through plastic deposits or contraction of cicatricial tissue.

Occasionally syphilitic proctitis is of the stenosing type, the mucosa, submucosa, and musculature being converted into fibrous tissue to the extent of one or several inches.

Stricture from secondary luetic *ulceration* or mucous patches are usually located near the anus, but stenoses following *tertiary ulcers* are most frequently situated a finger length or more above the anus.

Congenital luetic fissures and ulcers may irritate the sphincter and occlude the bowel through sphincteric contraction or by extending and healing, inducing true stricture as resulting scar tissue constricts the anus.

Gummatus deposits are encountered in women more frequently than men, and in the rectum more often than the colon. These syphilitic neoplasms originate in the submucosa and extend in either direction, involving all tunics, and project into the gut, lumen, and perirectal tissues. They are single or multiple, non-sensitive, circumscribed, saucer-shaped tumors, varying from walnut to orange size. Gummata may occlude the rectum by their size or degenerate to form ulcers that heal, causing cicatricial stricture.

Luetic strictures may be single or multiple, but the former prevail, are usually narrow, entirely encircle the bowel, sharply defined, cartilaginous to the touch, and offer marked resistance to introduction of the finger. The author remembers having treated but one stricture resulting from gummata.

Hemorrhoidal Stricture.—Hemorrhoids (Fig. 316) frequently occlude the anal canal, but hemorrhoidal and varicose ulcers are rarely responsible for anorectal stenoses. The author has treated several tight stenoses of the lower rectum caused by ulceration or sloughing following the carbolic acid injection treatment for piles (Fig. 329), and has observed dozens of anal strictures induced by Whitehead's operation (Fig. 354), and a few that followed removal of too much skin in other hemorrhoidal operations.

Rectal Valve Stricture.—Occasionally the bowel lumen is slightly or markedly diminished by abnormally large, hypertrophied, or congenitally deformed rectal—Houston's valves (Fig. 925)—that almost or completely encircle the bowel. As a result of chronic proctitis or ulceration these valves may be converted into plastic folds or cicatricial rims, and because of the frequency with which stricture is observed in vicinity of the *middle* it has been suggested that this valve often plays an important part in the formation of rectal stricture.

Extrarectal Stricture.—The rectal caliber is sometimes lessened by a displaced uterus, enlarged prostate, pessary, tumor, adhesion, sacrococcygeal deformity, perirectal abscess, or complicated fistula, that bend or constrict the rectum from without, or disease in

neighboring structures are responsible for thickening or formation of scar tissue in the rectal wall.

Neoplastic Stricture.—The rectum may be occluded by carcinoma (Fig. 578), sarcoma (Fig. 584), benign polyps, gummata, hyperplastic tuberculosis (Fig. 490), or sacrococcygeal, vesical, uterine, or prostatic tumors originating in or outside the bowel. Neoplasms do not cause annular or tubular stricture, but occlude the rectum by projecting into its lumen.

Miscellaneous Stricture.—Anorectal stricture has in rare instances resulted from bilharzia, actinomycosis, extensive submucous and perirectal abscess and accidental injury, fistula and encysted foreign bodies, and perforation of the mucosa or rectum by helminths.

PATHOLOGY

The gross pathology of anorectal stricture is variable. When obstruction is the result of inflammatory deposits, bowel tunics



Fig. 494.—Stenosis of a sacral anus following posterior proctectomy for carcinoma.

are thickened and uneven or lobulated and the mucosa congested, edematous, thrown into thickened folds or dotted over with diminutive papillomata or fully developed polyps, but when stenoses are caused by cicatricial tissue of healed ulcers, the mucous membrane feels leathery to touch, is corrugated or marked by pearl white, glistening, inelastic areas that immobilize and constrict the rectum.

Chronic periproctitis and peritonitis complicate strictures of magnitude and tend to immobilize and make the bowel rigid, but in the presence of bandular, diaphragmatic, and rectal valve stenoses mobility of the rectum is slightly interfered with except at the involved point.

The rectum is thin and slightly dilated or ballooned immediately above the obstruction and ulcers are present upon the upper surface of the stricture (Fig. 493), the effect of pressure, infection, and stercoral ulcers caused by impacted feces, and raw areas are occasionally seen at and below the block.

A blood-tinged mucopurulent discharge covers denuded areas and healthy mucosa, and when it, foreign bodies, or fecoliths lodge in an ulcer, abscess and fistula result. Usually the sinus opens above the constriction, but may burrow extensively below the mucosa or in the perirectal tissues (Fig. 493), finding an outlet in the lower rectum or buttocks, bladder, vagina, or urethra.

Owing to fatigue due to constant straining or entangling of controlling nerves or destruction of the sphincter muscle, stricture patients complain usually of incontinence. The discharge dribbles through the patulous anus and causes the formation of numerous skin-tabs and erosions in the perianal skin.

Bandular and membranous are smooth, sharply defined, and pliable, but annular and tubular strictures, secondary to ulceration or stenosizing proctitis, are uneven and rigid, the former being ring-like and contract about the examining finger, while the latter feel like cartilaginous tubes and resist instrumentation.

Local neurogenic and circulatory disturbances are present owing to the ensnaring of nerves and vessels by inflammatory deposits or scar tissue and weakening of vessels by endarteritis when *lues* is responsible for the inflammatory process.

Microscopic appearance of tissues in and about the rectum is similar in the majority of stenoses, and they can seldom be differentiated from each other by their *histopathology* except when the block is caused by malignant or benign neoplasms.

Occasionally straining incident to moving the bowel obstructed by stricture is accompanied by slight or extensive *procidentia recti*.

SYMPTOMS

The manifestations of anorectal stenoses may be local or constitutional and vary according to degree of obstruction. Patients having well-defined stricture exhibit loss of weight, sallow complexion, evidence of infection and gastro-intestinal disturbances,

such as indigestion, nausea, immediate desire to evacuate the bowel upon drinking hot coffee, may run an irregular temperature, and toxic symptoms incident to complete bowel blocking are sometimes in evidence.

Local manifestations of incipient stricture are sensation of something wrong in the rectum, mucus in the stools, and sluggish movements; next the patient complains of constipation, tenesmus, evacuation of mucopurulent discharge, smarting pain, and unrelieved following stool.

When stricture markedly narrows the bowel lumen it is responsible for persistent constipation alternating with diarrhea, sensation of weight incident to impacted feces, free discharge containing pus, blood, and mucus, excoriation of the parts, inflamed or hypertrophied external piles and radiating skin folds, frequent defecation, constant desire to evacuate the bowel, unrelieved by defecation, gastro-intestinal irritability and augmented peristalsis, tympanites and local pain when ulcers are extensive or located near the anus.

Deplorable or stenoses that almost completely obstruct the rectum are characterized by rectocolonic fecal impaction, distention of the proximal bowel with gas, chronic pelvic peritonitis, cramps, persistent desire to stool, dribbling of discharges and fluid feces through the anus that inflame mucosa and skin, annoying pruritus, hemorrhage, inflamed skin-tabs, partial or complete incontinence, abdominal pain, septic manifestations, abscess and fistulae opening into the rectum, upon buttocks or neighboring organs (Fig. 493), vesicle disturbances and occasionally perforation and peritonitis. When stricture causes almost or complete occlusion, marked distention, high temperature, rapid irregular pulse, facial anxiety, increased respirations, and the usual symptoms of acute intestinal obstruction are present.

DIAGNOSIS

When diagnosing anorectal stricture one must ascertain location of the block, degree of constriction, cause of the trouble, health of the patient, constitutional and local complications. A complete history is essential, as it is necessary to ascertain duration of the inflammatory condition, age of patient, loss of weight if there are syphilitic stigmata, and whether the patient has pulmonary lesions, if the afflicted has resided in tropical countries where entamebic and bacillary colitis are endemic.

In doubtful cases repeated *tuberculin* and *Wassermann* reac-

tion tests are made, and syphilitic treatment prescribed to ascertain the part, if any, played by tuberculosis or syphilis.

Marked loss of weight complicates tubercular and malignant strictures, but in the former it occurs more slowly and the patient exhibits tubercular manifestations, while in the latter cachexia is characteristic. Absorption of perianal fat is noticeable in both conditions and there is no excuse.

Some surgeons introduce the hand in the bowel, a procedure fraught with danger, since accompanying stretching may lacerate

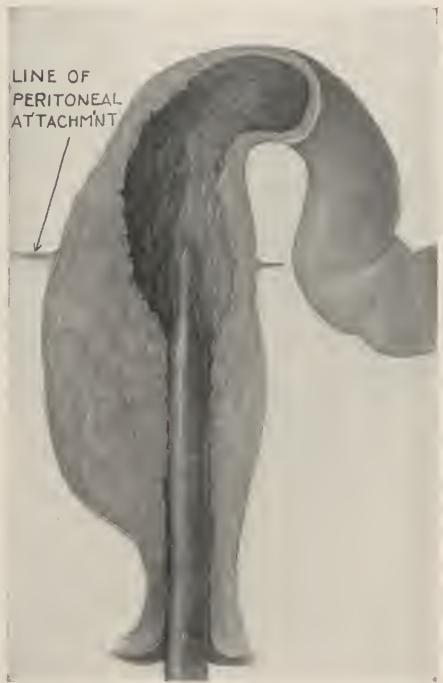


Fig. 495.—Diagnosing hypertrophic tubercular stricture with Wales' soft-rubber bougie. The instrument must never be forced through stenoses located above the peritoneal attachment.

the bowel and cause peritonitis, or tear the sphincter, which is followed by fecal incontinence.

One is justified in making a diagnosis of stricture when the patient gives a history of rectal inflammation, ulceration, or tumor, and having suffered from tympanites, pelvic tenderness, constipation alone or with diarrhea, pencil or tape-like stools, incessant desire for an evacuation unrelieved by defecation, reddish mucopurulent discharge, skin-tabs, perianal dermatitis and introduction of the finger, proctoscope (Fig. 496), or bougie meets with an

obstruction not caused by folds of mucous membrane, rectal valves, sacral, promontory, or narrow, angulated rectosigmoidal juncture.

Colonic, sigmoidal, and rectal strictures not recognized by constitutional manifestations, obstructive symptoms, discharge, palpation, fluoroscopic examination, and radiographs cannot be correctly diagnosed except following laparotomy and direct examination of the bowel.



Fig. 496.—Proctoscopic view of catarrhal rectal stricture showing ulcers in the mucosa below the constriction.

Radiographs are interesting and demonstrate the location, size, and length of bowel stenoses (Fig. 497), but are not essential for anorectal strictures because they can be accurately diagnosed with finger and proctoscope.

PROGNOSIS

The prognosis of stricture incident to neoplasms is good when tumors are extirpated without impairing bowel function. Fair results are obtained in unimportant congenital deformities—bandular and membranous occlusions—easily corrected by slight plastic operations, and when hypertrophied rectal valves blocking the bowel are divided with a Gant valve clamp.

Prognosis is not good in so far as a complete cure is concerned in anorectal strictures resulting from trauma, chronic inflammatory or ulcerative lesions, because they tend to recur following divulsion or incision, nor in tubercular stenoses complicated by pulmonary

involvement or cancerous ulceration, which is often inoperable, fails to heal, or recurs following extirpation.

Traumatic and inflammatory are complicated by peritonitis, adhesions, and plastic deposits that immobilize the rectum more often than malignant stenoses, but perforation into perirectal structures or neighboring organs complicates the latter more frequently than the former.

Vesical, vaginal, and prostatic examination is important to determine if there is any connection between the stenoses and disease in neighboring organs; and the rectum and buttocks are palpated and inspected for abscesses and fistulæ secondary to occlusion.

Blood and urinary analyses give little information, but careful study of the feces and finding tubercle or Shiga bacilli, *Entamoeba histolytica*, *Balantidium coli*, gonococci, worm segments, or their ova sometimes enables one to completely decide the diagnosis.

Anal are recognized by inspection, and the location, length, and character of *rectal* strictures are quickly ascertained by digital examination, since they are usually within reach of the finger.

Stenoses of the upper rectum and lower sigmoid are diagnosed chiefly by the symptoms, inspection through the proctoscope, and intelligent use of rubber (Fig. 500) or flexible metal olive-tipped bougies (Fig. 495). Instrumentation is dangerous when occlusion is 3 inches (7.62 cm.) or more above the anus because forcible introduction of the proctoscope or bougie may rupture the ulcerated rectum above the peritoneal attachment and result in death from peritonitis. The location, character, and size of the structural openings is determined by the finger and inspecting them through the proctoscope, which also enables the examiner to judge the degree of complicating ulceration, and when extirpated scar tissue often forms and subsequently continues the annoyance. Neglected deplorable single or multiple strictures (Fig. 491) sometimes terminate fatally, causing exhaustion, infection, or perforation, and peritonitis, complications easily avoided by local treatment, keeping the bowel lumen open, and regulating the stool or establishing an artificial anus followed by medicated irrigation.



Fig. 497.—Radiograph of rectal stricture.

TREATMENT

Some strictures are easily corrected, while others are difficult to relieve or cure, and in different cases treatment required may be *conservative*, *surgical*, or both.

Conservative Treatment.—Many stricture patients are emaciated, weak, anemic, nervous or tubercular, and improve under *local* reinforced by *supportive* treatment, including nourishing food, plenty of fresh air, moderate exercise, innocent amusement, blood and nerve tonics, antifermentatives, sedatives, analgesics, and narcotics that insure quiet and restful sleep.

Confinement in bed is not necessary except in deplorable cases and while cramps, diarrhea, tenesmus, and hemorrhage are troublesome; a word of encouragement is helpful because many sufferers believe their malady incurable.

Regulation of the stool is important since the bowel caliber is diminished, and *solid* accumulate above, while *fluid* feces dribble



Fig. 498.—Author's rectocolonic ointment applicator through which salve is applied to ulcers at and above the stenosis.

through the constriction, and are evacuated at short or long intervals. *Pipe-stem* or tape-like movements sometimes prevail, but the author has treated patients whose evacuations were normal in appearance where obstruction was high, water was absorbed, and firm feces collected below the stenosis before being evacuated.

Castor oil is indicated when the upper rectum, sigmoid, or colon contains scybalæ or large and soft fecal masses—when obstruction is marked, and frequently satisfactory evacuations are obtained with moderate doses of Epsom's, Glauber's, or Rochelle salts, $\frac{3}{5}$ ss (15.0); cascara sagrada, $\frac{3}{5}$ ss (1.80); compound licorice powder, $\frac{3}{5}$ ss (1.80); mild dinner pill, or mineral oil, $\frac{3}{5}$ j (30.0), administered once or twice daily.

When occlusion is almost complete and feces cannot be prevented from collecting by laxatives and cathartics obstruction is most satisfactorily prevented by frequent copious oil, ox-gall, soapsuds, or slippery elm water enemata projected through the strictural opening with the aid of a catheter or colon tube attached

to a fountain or piston syringe, made following dilation of the stenosis with a bougie when the tube cannot be introduced through the constriction.

When delayed evacuations result from spasmodic contraction of the sphincter or levator ani muscle, daily stools are facilitated by the application of heat to the anus, hot oil injections, and twice daily insertion of a suppository containing extract belladonna,

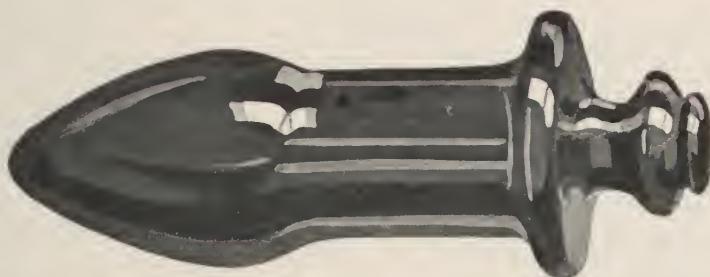


Fig. 499.—Self-retaining anal dilator occasionally employed in the treatment of sphincteralgia and anal strictures.

gr. $\frac{1}{4}$ (0.016), and cocaine, gr. $\frac{1}{8}$ (0.008), until muscular irritability subsides.

Many authors place too much importance on the *diet*, which in this class of cases ought to be liberal and nourishing, non-irritating, and composed of food elements that do not leave a large coarse residue. Tea, coffee, and alcoholic beverages are interdicted, since the gastro-intestinal canal of stricture patients is irritable, and



Fig. 500.—Wales' soft-rubber bougie employed in the treatment of high rectal strictures. Numbers indicate different sizes.

such drinks, ice-water, ice-cream, violent exercise, and extreme heat frequently induce colic or hyperperistalsis, diarrhea, and rectal tenesmus.

Individuals with stricture having *syphilis* are given the anti-syphilitic treatment advocated elsewhere, but neither salvarsan nor mixed treatment relieve or cure fully developed *cicatricial* stenoses, but in the author's practice have caused the absorption of

gummata, incipient plastic deposits, arrested proctitis syphilitica, and healed luetic ulcers that might have subsequently caused stricture.

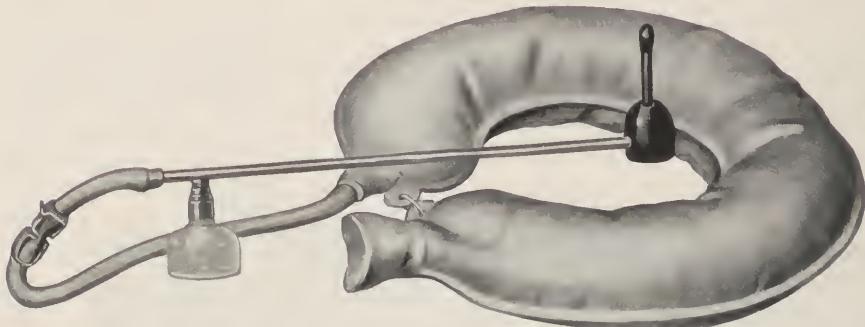


Fig. 501.—Jamison's seat syringe serviceable for introducing hot boric acid, ichthyoil 2 per cent., and other soothing solutions into the rectum in cases of inflamed hemorrhoids and stricture complicated by ulceration and proctitis.

Tuberculin in tubercular, *sera* in bacillary, and *emetin* in entamebic stenoses have utterly failed in the author's hands, and



Fig. 502.—Convenient method of introducing Wales' bougies in the gradual or forcible divulsion of anorectal stricture.

radium, *x-ray*, and other vaunted cures have not benefited ano-rectal cancerous stenoses.

Antidiarrheal medicines are contraindicated, since they cause distressing peristalsis and favor impaction and do not arrest frequent fluid movements consequent upon fecal accumulations that cannot pass the obstruction. Daily warm rectal *irrigations* of ichthyol, 2, or boric acid, 4 per cent., are servicable because they free the bowel of discharges and toxins, and stimulate the healing of inflamed and ulcerated areas in the mucosa.

Electrolysis, highly recommended in some quarters, failed to absorb cicatricial stenoses, and the author has not succeeded in permanently improving the condition of rectal stricture patients with any form of electricity, but has observed painful ulcers in the rectum caused by electric treatments.

Gradual Dilatation.—Careful, graduated stretching of stenotic openings within 3 inches (7.62 cm.) of the anus with fingers, anal dilators, or bougies (Figs. 499, 502) is beneficial; divulsion is very dangerous when carelessly performed for stricture located above the peritoneal attachment, since the ulcerated gut may be ruptured and the patient die of peritonitis.

Rectal strictures to be dilated are exposed through the proctoscope (Fig. 496) and their calibers determined by inspection, when a proper sized bougie is selected and carefully introduced through the constriction.

The author's spring dilator or an ordinary bougie (Fig. 502) may be left *in situ* a few moments to enlarge the opening, or over night, with the hope of causing absorption. Usually treatments are not made oftener than three times weekly because daily instrumentation increases pain or traumatizes the bowel and causes slight or profuse bleeding. The author's spring dilator (Fig. 503) is preferable because it accomplishes better results than other instruments and enables the patient to procure daily stools by keep-

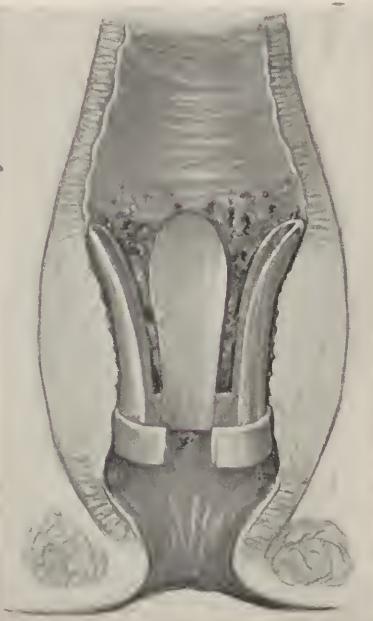


Fig. 503.—Author's spring stricture dilator employed in the treatment of rectal stenoses; the instrument left *in situ* for days or weeks favors absorption through pressure necrosis, facilitates movements, and makes colostomy unnecessary in certain inoperable cases.

ing the strictured gut open and causes the absorption of obstructing fibrous deposits.

Self-retaining soft- or hard-rubber dilators (Fig. 499) are employed for stenoses near the anus, but lengthy, pliable rubber bougies—Wales' (Fig. 502)—are preferable for constrictions in the upper rectum or lower sigmoid flexure. Mechanical metal dilators frequently employed are dangerous because they injure or rupture the gut; the author knows of several deaths caused by such instruments or large bougies suddenly forced through high-lying strictures.

A soft-rubber bougie well anointed may be guided into the rectum with the left index-finger or be introduced through a proctoscope (Fig. 502), in which case its distal end should be smooth so that the proctoscope may be easily withdrawn over it when inserted, otherwise passage of the bougie may be interrupted by a fold of mucosa, rectal valve, or diverticulum at the side or below the stricture.

When the patient's condition is not improved by repeated dilatation with soft-rubber bougie or inflatable rubber bag and the above therapeutic measures fail to relieve the sufferer, surgical intervention is indicated.

Surgical Treatment.—Operative are preferable to conservative measures in the treatment of stricture because under the latter the patient grows worse until obstruction ensues.

Surgery is not satisfactory, since no operation accomplishes a complete cure owing to the fact that one is dealing with scar tissue which recontracts as the wound heals. Incising of stricture is occasionally followed by infection, abscess, fistula, or fecal incontinence.

When operative measures permanently enlarge the bowel caliber, diarrhea, cramps, and tenesmus subside, ulcers are quickly healed, and the patient rapidly regains his health, but when obstruction recurs death may ensue from exhaustion or obstruction unless the block is relieved by an artificial anus or author's spring dilator.

Below are listed the most reliable operations employed in the treatment of anorectal strictures:

1. Forcible divulsion.
2. Internal (partial) proctotomy.
3. External (complete) proctotomy.
4. Excision.
5. Proctoplasty.
6. Rectosigmoidostomy.
7. Gant's valve clamp proctotomy.
8. Colostomy.

Forcible Divulsion.—This procedure appeals to patients because a knife is not used. Forcible or rapid stretching of strictures occasionally affords relief, but is employed in low-lying stenoses only, for it is accompanied by laceration of the bowel which may terminate fatally when injury is above the peritoneal attachment.

Divulsion is made with the fingers in preference to bougies, specula (Fig. 504), or mechanical dilators, because with them giving way of the bowel wall is at once detected before serious damage is done.



Fig. 504.—Divulsion of low rectal stricture with author's operating speculum following eucainization of the lower rectum: *c*, Coccyx.

Following anesthetization the author inserts the fingers one after another through the stricture until three fingers have been introduced, which enlarges the bowel caliber sufficiently. The operation is completed by applying ichthyol or balsam of Peru to overlying ulcers and inserting a gauze plug to control hemorrhage and drain the rectum.

Subsequently *gradual* is practised at short and *forcible* divulsion at long intervals to prevent recontraction of the stenosis.

Internal — Partial — Proctotomy. — Internal proctotomy (Fig.

505) is performed by guiding a blunt-pointed bistoury with the index-finger to a point above the block and incising the obstructing band, diaphragm, or stenosis at one or more points and placing a gauze drain in each cut, which are left projecting through the anus.

This procedure is dangerous and to be condemned, because the wounds are internal and cannot be perfectly drained, consequently infection frequently occurs, terminating in abscess or peritonitis.

External—Complete—Proctotomy.—This operation (Fig. 505) is preferable, since it requires but a moment, markedly enlarges the

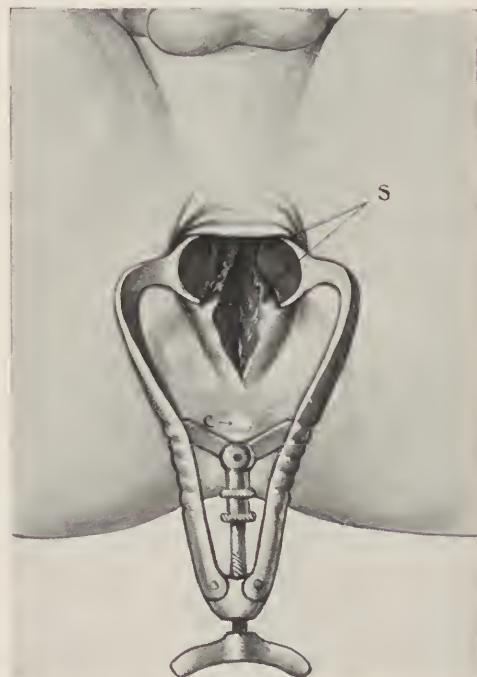


Fig. 505.—Complete posterior proctotomy for stricture performed under local anesthesia through the author's operating speculum: *s*, Stricture; *c*, coccyx.

strictured rectal caliber, and is seldom followed by infection, since it provides for free drainage, owing to the incision being carried through the anal canal, sphincter muscle, and perianal skin.

The extensive cut favors comfortable evacuations, enables the attendant to easily treat ulcers, and insert gauze packs that prevent recontraction of the rectum as the wound heals.

The *technic* consists in guiding the author's special blunt-pointed, long, strong bistoury (Fig. 193) well above the stenosis

with the finger, the edge of which is directed toward the sacrum. With a single bold stroke carried posteriorly and downward the stricture, rectal wall, anal canal, sphincter muscle, skin, and other structures are incised almost to the coccygeal tip, following which polyps, ragged wound edges, and skin-tags are removed and ulcers are cauterized or suitably treated. Profuse hemorrhage is controlled by lightly packing the wound with gauze strips.

Dressings are not changed for forty-eight hours to avoid bleeding, but when they are removed the rectum is irrigated, topical applications are made to lesions, and the wound drained with loose gauze. Thereafter the patient is permitted a full diet, daily semi-solid stools are procured, since fluid feces cause rectal burning and often lead to infection, while hardened feces induce pain when evacuated. The wound is treated like a deep fistula cut, except that the finger or bougie is inserted when necessary to forestall recontraction of the stricture.

Like above procedures, external proctotomy is contraindicated when the constriction is more than 3 inches (7.62 cm.) above the anus, and a second operation may be again necessary if the bowel becomes partially or completely occluded. Occasionally the patient complains of incontinence, which sometimes is unavoidable, but usually has better control over the bowel following than before operation.

Excision.—Frequent failures from other procedures would indicate that extirpation is the operation of choice for rectal stricture, but often it is not, since there are many objections to this method of dealing with rectal stenoses.

Cancerous tumors are more easily excised than chronic cicatricial stenoses because they are confined to the bowel lumen and the rectum can be quickly freed, while non-malignant strictures often the result of chronic inflammatory and ulcerative processes are complicated by dense adhesions that bind the bowel on all sides to adjacent structures, completely immobilizing the gut; consequently, extirpation of rectal stenoses requires considerable time, is accompanied by profuse bleeding, and not infrequently the ureter, bladder, prostate, urethra, or vaginal septum are injured during operation. Postoperative infection, abscess, fistula, and partial or total fecal incontinence are sometimes distressing sequelæ.

Excision is indicated when division of the constriction, proctoplasty, or proctotomy have not given permanent relief in cases of anorectal stricture, where the bowel is movable and can be freed from surrounding structures.

Removal of the *sphincter* is imperative for low-lying stenoses, and to limit or prevent incontinence the levator ani muscle is conserved and sutured snugly around the bowel before the rectum is pulled through the author's buttonhole incision and stitched to the skin (Fig. 605, A).

When the constriction is sufficiently high the anal muscle is split anteriorly or posteriorly and retracted laterally while the rectum is being freed and amputated, following which mucosa of the anal ring is removed; the proximal end of the bowel is drawn downward and the skin united, when split ends of the sphincter are joined with catgut or linen stitches.

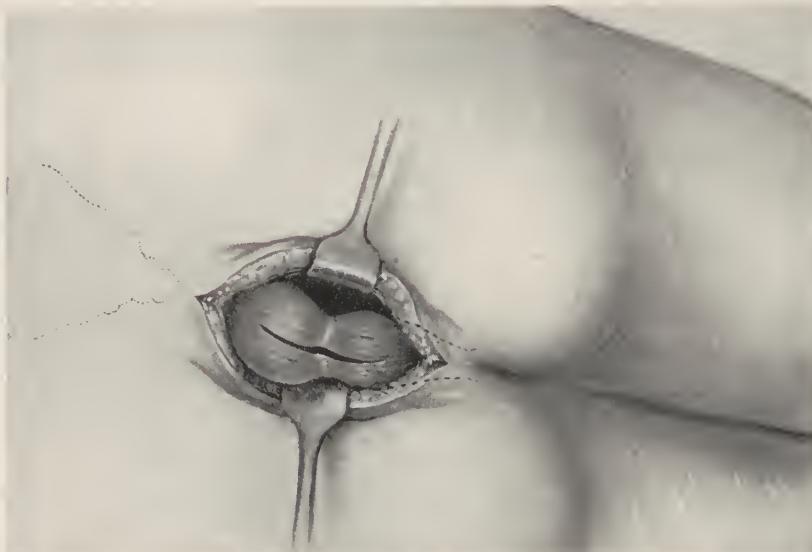


Fig. 506.—Proctoplasty as performed by the author for stricture. *First step:* Through a posterior median incision, extending from anus to coccyx or higher stricture, the rectum is exposed, freed, and split longitudinally.

Hard-and-fast rules cannot be laid down for removing anorectal strictures because they may be single, multiple, or involve the upper and lower rectum. Stenoses within 3 inches (7.62 cm.) of the rectum are usually excised by *inferior proctectomy*—perineal route—or in women, following splitting of the rectovaginal septum—*vaginal proctectomy*—which provides abundant room for dissection; usually several inches of the bowel can be extirpated by inferior or vaginal proctectomy, reinforced if necessary by coccygeal excision.

The author resorts to *posterior proctectomy*—modified Kraske operation—less frequently than formerly, because it is accompanied by shock, and loss of bone weakens the pelvic support, but

in selected cases this procedure is the operation of choice for stricture involving the middle or upper rectum.

In rare instances *abdominoperineal proctectomy*—combined operation—is justified in the removal of high strictures situated at the rectosigmoidal juncture or lower sigmoid, but the operation is objectionable as a routine procedure in this class of cases because of length of time required, accompanying shock, and frequency of peritonitis. In the majority of instances *colostomy*, which is safe and offers permanent relief, is preferable to excision in cases of deplorable stricture.

The *technic* of extirpating anorectal *cancers* and *strictures* is practically the same, and since the methods of performing *inferior*

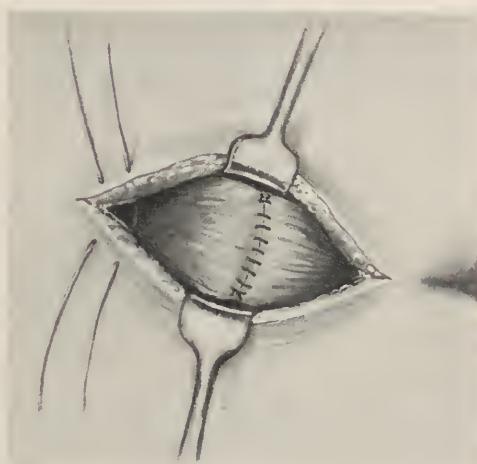


Fig. 507.—Author's proctoplasty. *Second step:* The longitudinal incision is sutured transversely, enlarging the rectal caliber.

proctectomy—perineal excision, *superior proctectomy*—Kraske's or sacral excision, *vaginal proctectomy*, and *abdominoperineal proctectomy* have been fully discussed and illustrated in chapters devoted to extirpation and resection of the rectum and sigmoid flexure for malignant growths, further discussion of these procedures is considered unnecessary here.

Proctoplasty.—This operation (Figs. 506–508), performed in some quarters, is impracticable in nearly all cases, because it is difficult, frequently followed by infection, and does not permanently improve the patient's condition.

Briefly stated, the *technic* consists in approaching, isolating, and splitting the bowel longitudinally through posterior incisions (Fig. 506), and suturing the wound transversely (Fig. 507), thereby in-

creasing the gut lumen at the constricted point before the wound is drained and closed (Fig. 508).

Rectosigmoidostomy.—To relieve obstruction incident to stricture the sigmoid flexure has been anastomosed with the rectum below the constriction with the aid of sutures or Murphy's button. The spur thus formed is subsequently divided after the author's plan with his rectal valve clamp left *in situ* following the introduction of one blade into the artificial and the other through the strictural opening (see Figs. 509 and 510).

The procedure is impracticable, since it is difficult, dangerous, seldom possible, and because the rectum except at the rectosigmoidal juncture has no peritoneal covering, and union between it



Fig. 508.—Author's proctoplasty. *Third step:* External wound is closed with catgut supported by linen retention sutures and a drain inserted.

and the sigmoid does not always take place, and under such circumstances peritonitis, abscess, or fistula are likely complications.

Gant Valve Clamp Proctotomy.—Membranes, fibrous bands, and congenitally large or hypertrophied rectal valves obstructing the rectum are divided by exposing the offending structures through a proctoscope and slipping a Gant valve clamp over them, which sloughs out in from three to five days through pressure necrosis. The operation requires but a moment, is performed in the office, and affords immediate relief.

Diaphragmatic and membranous partitions that almost or completely encircle the rectum are quickly eliminated with the aid of the author's operating speculum by seizing with T-forceps and trimming them off level with the mucosa with knife or scissors.

Colostomy.—The establishment of an artificial anus (Fig. 511) is objectionable because of the unnatural location of the outlet,

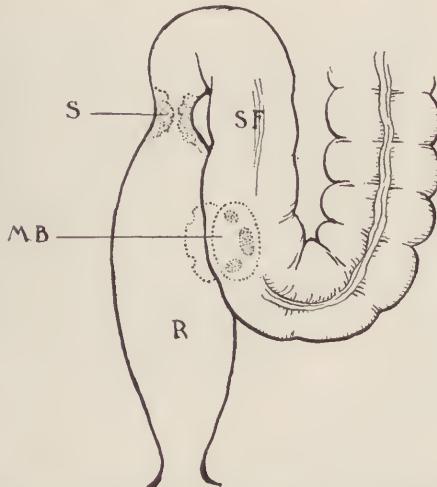


Fig. 509.—Rectosigmoidostomy for high rectal stricture: S.F., Sigmoid flexure; S, stricture; M.B., Murphy button anastomosis; R., rectum.

embarrassing noises caused by escaping gas at inopportune times, and disgusting fecal odor noticed during defecation and when the

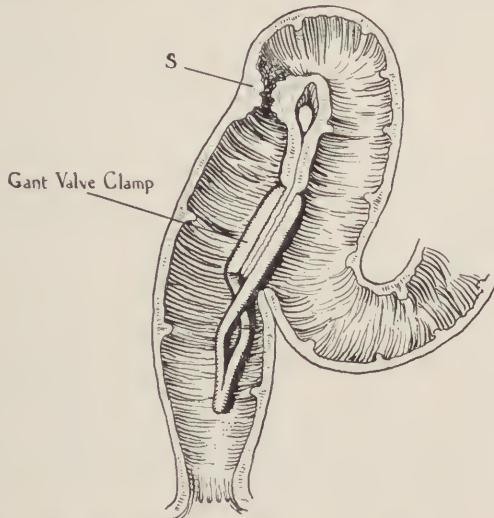


Fig. 510.—Rectosigmoidostomy, secondary operation for enlarging the rectosigmoidal opening through pressure necrosis accomplished with Gant's valve clamp: S, Stricture.

anus is improperly constructed and leakage frequently occurs. Consequently, colostomy is not justified in muscular, membranous,

or fibrous stenoses as long as the patients can be made comfortable with laxatives, enemata, and keeping strictural opening suffi-



Fig. 511.—Controllable artificial anus established for inoperable luetic stricture of rectum.

ciently large by divulsion (Fig. 504) or occasional proctotomy (Fig. 505) and subsequent dilatation.

An artificial anus reinforced by medicated irrigation is a prophylactic measure in stricture complicated by persistent catarrhal

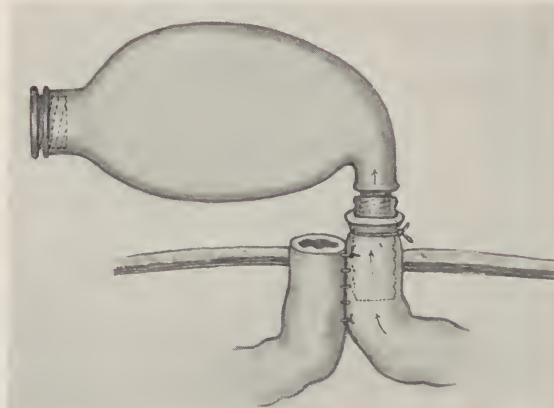


Fig. 512.—Author's soft-rubber fecal reservoir attached to his corrugated hard-rubber tube which catches feces subsequent to colostomy operations.

or specific proctitis or ulceration because it enables one to free the rectum of irritating toxins and feces and heal inflammatory areas,

thereby arresting the strictural process and preventing subsequent partial or complete obstruction from stenosis. Under such circumstances the procedure is preferable to proctotomy, which offers temporary relief and is not very objectionable, because the artificial anus can be closed and continuity of the bowel re-established at an opportune time.

Except in cases favorable for excision, *permanent colostomy* is the operation of choice where function of the rectum is permanently impaired or destroyed by extensive fibrous tissue deposits that occlude its caliber to a slight or considerable extent, because following the establishment of an artificial anus the patient's symptoms immediately disappear, he rapidly gains in weight, and is able to assume social and business duties, for obstruction is permanently relieved.



Fig. 513.—Multiple tubercular inoperable strictures where feces escaped at four points—cecostomy, fistulae in the central abdomen, and sigmoidostomy openings. Note prolapse of the gut through the cecal and left inguinal stomas.

Several of the author's patients upon whom colostomy was performed fifteen and twenty-five years ago are comfortable, in good health, follow their vocations, and are contented, having become accustomed to the abdominal opening. When, as occasionally occurs, the inflammatory process is arrested and the stricture is *absorbed*, the artificial anus has been closed, and in no instances has function of the gut been impaired through non-use following colostomy.

The author will omit discussing the *technic of temporary and permanent colostomy* and methods of *closing artificial ani* here because the steps in these procedures are fully described in another chapter devoted to a consideration of enterostomy, colostomy, and fecal fistulæ.

Chapter XLVII

Non-malignant Growths Involving the Rectosigmoidal Juncture, Rectum, and Anus

POLYPS—ADENOMAS—POLYPOSIS, VILLOUS ADENOMA, PAPILLOMA, CONDYLOMA, FIBROMA, LIPOMA, MYOMA, ANGIOMA, MYXOMA, ENCHONDROMA, LYMPHADENOMA, OSTEOMA, INFLAMMATORY TUMOR, TUBERCULAR NEOPLASM, GUMMA, SPINA BIFIDA, HYPERTROPHIED ANAL PAPILLÆ, PARASITIC TUMORS, CYSTS, DERMOIDS, POSTANAL DIMPLES, SACROCOCCYGEAL TUMORS.

If one includes the various types enumerated in the chapter heading, *benign* growths of the rectum are encountered as frequently as *malignant*. Non-malignant tumors and cysts of the anorectal region may be *congenital* or *acquired*, are encountered more often in women than men between the ages of twenty-five and forty-five, in different countries, all classes, various segments of the gastro-intestinal tract, and may cause slight discomfort, considerable pain, or in rare instances terminate fatally, the result of exhaustion, infection, hemorrhage from the breaking or sloughing of tumor masses, or from intestinal obstruction.

Benign anorectal tumors grow slowly, involve superficial tunics of the bowel, do not infiltrate adjacent structures, are not complicated by rapid loss of weight, metastasis, or cachexia, seldom recur when extirpated, possess a systematic cell arrangement, and in the majority of instances are composed of connective, glandular, muscular, or adipose tissue, alone or intermingled.

Sometimes apparently innocent neoplasms upon being sectioned prove to be *benign at one and malignant at another part*. Non-malignant growths occur throughout the gastro-intestinal tract, but are met with in the *rectum* five times as often as in small intestine or colon, and may be disseminated over the mucosa from the ileocecal valve to the anus (Fig. 521), and in such cases tumors are more numerous and larger in the lower sigmoid and rectum.

Innocent tumors frequently degenerate into cancer owing to their construction and the irritation to which they are subjected by cathartics, careless introduction of enema tubes, prostatic massage, intestinal discharges, passage of feces, instrumentation, employment of patent pile cures, contraction of anorectal muscles, and infective organisms.

Benign growths are not very common in children and are encountered most frequently in youngsters between eight and twelve years of age, though the author has several times removed polyps



Fig. 514.—Anorectal mucous and skin polyps complicating ulcerative proctitis.

from the anus or rectum of infants and children varying in age from two months to six years, as well as from young adults who suffered from coloproctitis, worms, or chronic discharge.

CLASSIFICATION

The following embrace nearly if not all types of benign tumors encountered in the lower bowel, perirectal structures, upon buttocks, and in sacrococcygeal region:

1. Polyps.
2. Adenomas.
3. Multiple adenoma—
polyposis.
4. Villous adenoma.
5. Papilloma.
6. Condyloma.
7. Fibroma.
8. Lipoma.
9. Myoma.
10. Angioma.
11. Myxoma.
12. Enchondroma.
13. Lymphadenoma.
14. Osteoma.
15. Inflammatory tumor.
16. Tubercular neoplasm.
17. Gunma.
18. Spina bifida.
19. Hypertrophied anal papillæ.
20. Parasitic tumors.
21. Cysts.
22. Dermoids
23. Postanal dimple.
24. Sacrococcygeal tumors.

ETIOLOGY AND PATHOLOGY

Polyps.—All anorectal tumors having *pedicles* are called *polyps* (Figs. 515, 516), whether their distal extremity is pointed or enlarged, and since most benign tumors are *pedunculated*, *polypi* and *non-malignant* neoplasms having pedicles are synonymous; the terms *adenoma*, *lipoma*, *fibroma*, *myoma*, *lymphoma*, *myxoma*, and *angioma* are employed to designate the pathology of the neoplasm.

Tumors having a broad infiltrated attachment or base are apt to be in the *transitional stage* or cancerous, and it is a fairly safe rule to consider new growths as benign so long as they possess a *definite pedicle*.



Fig. 515.—Rectal polyps: A, Hard fibrous; B, soft adenomatous.

Originally benign tumors are ovoid or pyriform in shape, or extend at a right angle to the gut (Fig. 515), but as they enlarge and develop a pedicle they droop into bowel (Fig. 516) or extrude through the anus (Fig. 515) because of their weight, straining, being daily dragged down by feces, or having been caught and retained by the sphincter or levator-anus muscle during defecation; pedicles continue to elongate as the tumor enlarges and is subjected to increased trauma.

Non-malignant tumors may be *single* or *multiple*, *large* or *small*—raspberry to orange size—*isolated* or *disseminated*, *soft*, *semisolid* or *hard*, *fragile* or *tough*, *dark purple*, *reddish*, *pearl gray* or *black*—if strangulated—in *color*, located in the *colon*, *sigmoid flexure*,

rectum, or at the *anus*, retained above the sphincter or extruded through the *anus*, ovoid, round, pyriform, clubbed or *cauliflower*-

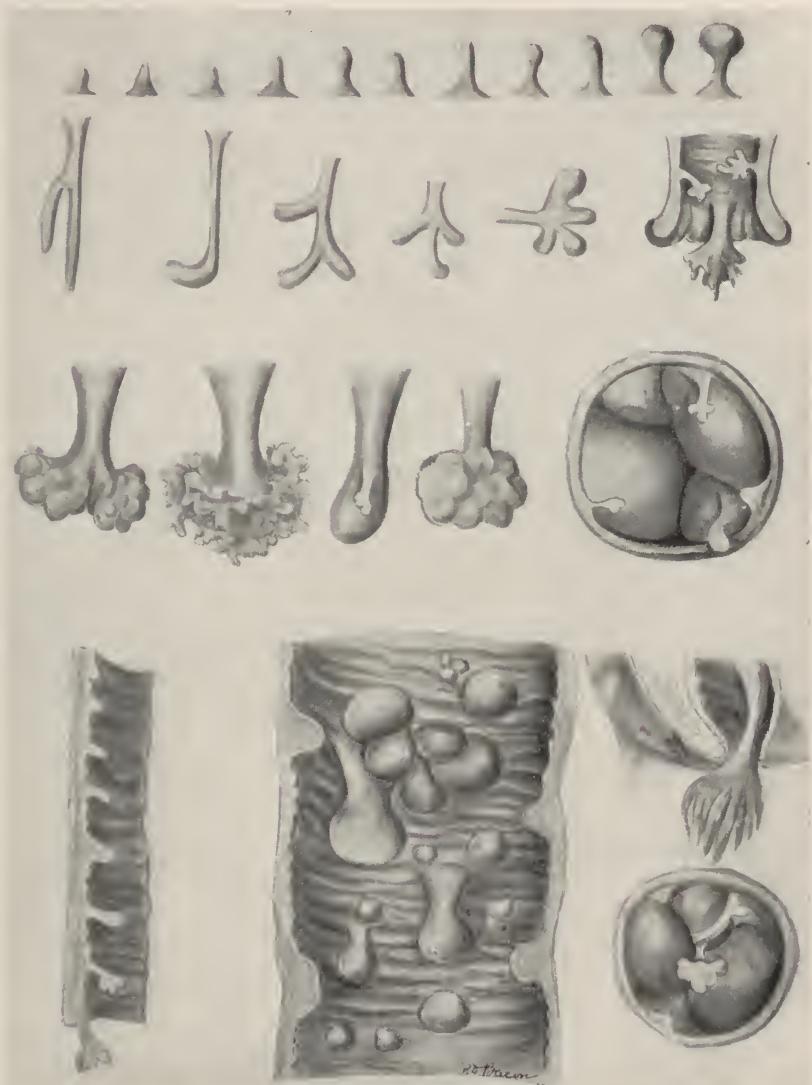


Fig. 516.—Schematic drawing of different types of polyps showing variations in their size, shape; short, long, thin, and thick pedicles, manner of attachment, and appearance assumed as they enlarge.

like in shape, have a *smooth*, *nodulated*, or *ragged* surface, *sessile* or *pedunculated* attachment, and one or several may grow from a

single stalk, appear as individual neoplasms or like clusters of grapes, and partially or completely block the bowel, and be composed, alone or combined, of gland—*adenoma*, muscle—*myoma*, adipose—*lipoma*, lymphoid—*lymphoma*, connective—*fibroma*, cartilagenous—*enchondroma*, mucous—*myxoma*, osseous—*osteoma*, tegumentary—*papilloma*—or other tissue of the rectum or perianal skin, together with blood and lymph-vessels.

Pedicles of benign anorectal and perianal tumors may be thin or thick, pin to thumb size, short or long, delicate or strong, uneven or smooth, stationary or elastic, are composed chiefly of mucosa, submucosa, vessels, and in rare instances they have originated in the spine, subperitoneal fat, sacrococcygeal, perirectal or perineal regions, ischiorectal fossa, or buttocks.

Adenoma.—Adenomata are encountered more frequently than other anorectal tumors; may be single or multiple, located in the rectum, sigmoid or colon, vagina or rectovaginal septum; are variable in color, size, and contour; may or may not extrude through the anus, and remain innocent or slowly degenerate into cancer.

The author has treated cases where tumors were located in different segments of the gut—*jejunum* 1, *ileum* 3, *ileocecal valve* 1, *cecum* 1, *colon* 35, and *rectum* 65; and many additional cases including diminutive polyps attached to hemorrhoids, the anal margin, sacral dermoids, and also condylomata or hypertrophied papillæ. Adenomata may be soft or dense, pale or reddish in color, have smooth, nodular, or broken surface, and their pedicles narrow or flat, short or long, and these polyps have incited tenesmus, caused sphincteric contraction, and induced more or less obstruction. Adenomata occur most frequently in individuals having a congenitally abnormal arrangement of glandular or lymphoid tissue, which when persistently irritated by coloproctitis, irritating discharges or bruising incident to feces, undergo hypertrophic changes; the intestinal glands become inflamed, distended, and displace the mucosa, inwardly forming a diminutive tumor that first projects at right angle and then downward into the gut lumen (Fig. 517) as it grows and is dragged upon by feces.

Such neoplasms are composed chiefly of epithelial and glandular tissue, subject to variation, and when hyperplastic development is internal, they are designated *adenomata* (Fig. 520), but when tumors extend outward and with lawless cells they are malignant, and are designated *adenocarcinomata*.

Adenoma containing considerable fibrous, muscular, or lymphoid tissue is designated as *adenofibroma*, *adenomyoma*, and *adenolymphoma*.

Usually glandular tubules are numerous, closely packed, encompassed by connective tissue, and the epithelial covering con-



Fig. 517.—Enormous adenoma diagnosed by three surgeons as rectal cancer. Excised by the author under local anesthesia.

sists of cuboid, cylindric cells. Sometimes glands atrophy or degenerate, leaving closed outlets or diminutive caverns in the tumors. Partial or extensive desquamation of epithelium may



Fig. 518.—Pseudopolyps complicating amebic dysentery.

be observed in the neoplasm, stalk, or both, and a blood-tinted viscid secretion exudes from such areas which contains serum, leukocytes, and eosinophils.



Fig. 519.—Section of colonic adenoma. Photograph of an entire section. Above is a highly complicated adenomatous growth which does not at any point break through the muscularis mucosæ. The three dark patches below the adenoma are hyperplastic solitary lymph-follicles, or possibly the fused follicles of a Peyer patch. On the left the adenomatous growth gradually decreases and shades off into the normal mucous membrane below. At the lowest part of the section is a normal Peyer patch, consisting of oval lymph-nodes. The muscularis mucosæ can be traced as a thin line underlying the mucous membrane, although it can hardly be seen at the upper part, where the adenomatous growth is thickest. Under the microscope, however, it can be resolved and shown to be still intact, although the pressure of the overlying growth has thinned it out and caused some irregularity in its arrangement. The tumor, therefore, shows no tendency toward infiltration of the neighboring tissues, and is to be considered as of a *benign* nature, although such growths are liable at any time to develop malignancy. The submucous tissue appears as a pale layer containing numerous blood-vessels, and to the right of this are the muscular layers, somewhat torn in preparing the specimen.

Adenomata may persist for years without undergoing malignancy, but the majority degenerate into cancer in from one to seven years, depending on the patient's vitality, degree of rectal irritation, and character of the tumor, for *soft* polyps more often undergo malignant changes than *dense* or fibro-adenoma.

Rectal adenomata and adenomyxomata are occasionally met with in children suffering from worms, enterocolitis, and adenoids,

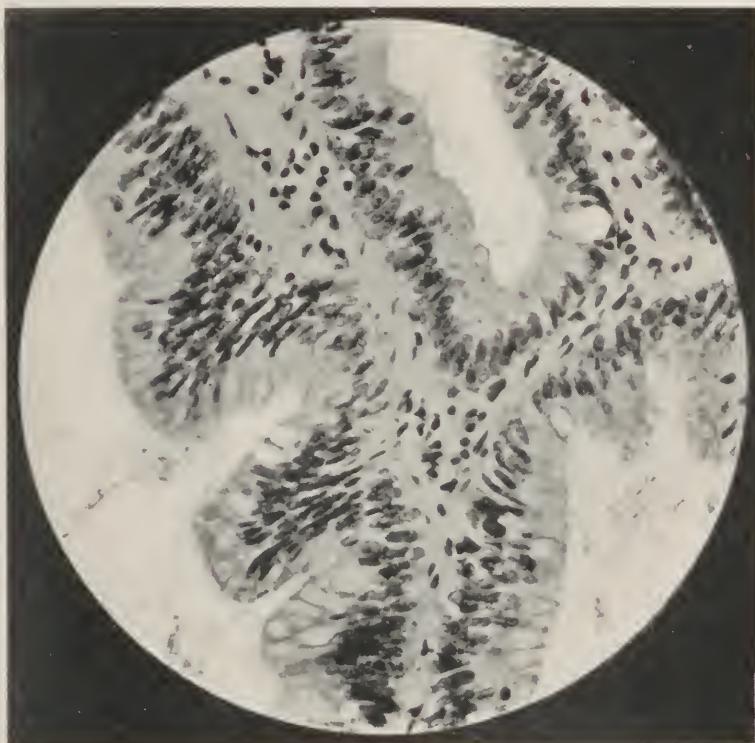


Fig. 520.—Adenoma of the rectum. A portion highly magnified. The alveoli containing mucous and granular detritus are lined by columnar epithelial cells, the nuclei of which are deeply stained and somewhat elongated. Many of the cells are distended with mucus, forming the so-called goblet-cells. The cells rest on a basement membrane which, however, cannot be clearly recognized in the photograph, and the supporting connective tissue is highly cellular, but not more so than normally in the intestinal mucous membrane.

and Huber suggested an abnormal development of lymphoid tissue—*constitutio lymphatica*—to account for the association of adenoids and adenomata of the rectum.

Polyps in the young—occasionally responsible for proctidinia—composed of glandular, mucoid, and slight amount of fibrous tissue, are glairy, soft, friable, and break off spontaneously upon

traction or ligation, but owing to their small raspberry-like size induce but slight discomfort—tenesmus and a mucous discharge.

Adenomyomas, large or small, pedunculated or flat, occasionally involve the vagina and rectovaginal septum along with true glandular tumors.

Multiple Adenomas—Polyposis.—This condition is frequently but falsely designated *polyposis* (Fig. 521), a misnomer, since the majority of growths are ovoid, pointed or nipple shaped, and have no pedicle, the remainder, having attained considerable size—raspberry to egg—are pedunculated.



Fig. 521.—Rectocolonic polyposis.

These neoplasms have also been diagnosed as *papillomata* (Fig. 522), but this is incorrect, since adenomata originate in deeper or glandular structures, while true papillomata develop in the columnar epithelium or inner surface of the mucosa, are smaller, and rarely if ever develop pedicles. Adenomas and papillomas are frequently encountered in the same case.

The expression “multiple adenomata” is not employed to indicate a few scattered rectal polyps, but a much more serious condition characterized by numerous *recent* ovoid or pyriform or *older* pedunculated tumors disseminated throughout the rectum—above the anal canal—sigmoid flexure, and colon (Fig. 521), composed

chiefly of glandular tissue thickly interspersed with fibrous and muscular elements, an artery, vein, and sometimes lymph capillary.

Neoplasms and polyps of this class secrete an abundant thick, offensive, glairy, or if eroded, blood-tinted, irritating discharge that incites tenesmus and frequent evacuations unrelieved by defecation.

Multiple adenomata are usually encountered in individuals having a lowered resistance (often from childhood), and this would indicate an inherited tendency to the condition—a *congenitally* abnormal state of the intestinal glands or epithelium—which upon being subjected to persistent irritation, such as nutritional, catarrhal,



Fig. 522.—Sigmoidoscopic view of papillomata (small) and adenomata (large) complicating ulcerative coloproctitis.

and inflammatory diseases, bruising by hardened feces, daily purging or medication, gastro-enteric diarrhea, and intestinal toxemias, inaugurate hypertrophic and hyperplastic changes in the mucosa that terminate in the formation of diminutive and larger growths within the involved gut.

In neglected cases of polyposis tumors multiply and enlarge; discharge is augmented and becomes exceedingly acrid; ulcers form between the growths, and hyperperistalsis, intussusception, procidentia recti or obstruction develop, the patient assumes an exhausted anemic appearance, and obtains rest neither night nor day owing to enterospasm, erosions in the mucosa and perianal skin, and constant desire to stool. Multiple adenomata show a still

greater tendency to become malignant—over 50 per cent.—than single or multiple, widely separated polyps.

The author has handled 68 cases of polyposis affecting the colon, sigmoid flexure, and rectum, 2 of which involved the lower ileum. In the majority catarrhal or specific colitis preceded formation of the tumors, but in several no antedating gastro-intestinal disturbance occurred, and tumors were suspected from the discharge, or accidentally discovered through the proctoscope while patients were being examined for other conditions. Multiple adenomata were observed to complicate colonic tuberculosis, but the author has encountered them in connection with luetic affections of the intestine.

In the author's case (Fig. 955) *benign* and *malignant* growths were observed side by side, while other adenomata were in transi-



Fig. 523.—Large fist size so-called villous adenoma ligated and excised by the author following infiltration of the pedicle with eucain. Two prominent surgeons had previously advised rectal extirpation in this case.

tional stages showing normal and disturbed arrangement of the cells when sectioned.

Villous Tumors—V. Adenomata.—There are no true villous tumors, and growths to which the name is applied are adenomata upon the surface of which hyperplastic changes have taken place in the villi to form ovoid, teat-like or branching, soft, raspberry-like enlargements, smeared with a glairy, tenacious, blood-tinted mucus (Fig. 523). The underlying adenoma is composed chiefly of glandular structure containing connective-tissue strands or muscle tissue, or both.

Villous adenomata occur more frequently in men than women—2 to 1—are more common than supposed, and most often encountered in persons between thirty and fifty years of age; usually

located on the posterior surface of rectum; are single, but may be multiple, and their average size—walnut to orange—is larger than ordinary adenomata.

The author has observed 3 cases of multiple—numerous, variable sized—villous adenomata, and 9 cases of large single growths which varied from an English walnut to fist size (Fig. 523) attached by flat or round, thick, strong, whitish pedicles containing considerable fibrous tissue. Two tumors showed *beginning malignant degeneration*, and a permanent cure followed removal of these growths by excision and suture, or ligation of the pedicle and amputation.



Fig. 524.—Proctosigmoidoscopic view of papillomata and polyposis that involved the entire colon in a case of bacillary colitis.

These tumors secrete a watery fluid that together with the growth excites frequent tenesmus and evacuations, or causes hemorrhage the result of a segment of the friable neoplasm breaking or being caught in the sphincter and sloughing off.

Villous adenomata extrude through the anus when their pedicles are long, unless the growth is large and cannot be forced through the anal canal; the papillomata dotting their surface closely resemble those occasionally encountered in the bladder.

Sometimes villous tumors break down in the center or side, leaving central pockets or ragged lateral crevices in the tumor, points of focal infection which favor the formation of abscess or transition of the growth into cancer.

Papillomas.—These diminutive growths are encountered in the rectum and integument surrounding the anus and vulva; growth is stimulated by heat, moisture, maceration, and uncleanliness that excite the epithelial cells to proliferation (Fig. 524).

Mucous papillomata originate in the columnar epithelium and superficial glandular structures and skin; warts develop in the papillary layer of the integument. The former are secondary to coloproctitis and bowel affections characterized by an acrid discharge, and the latter generally to leukorrhea or gonorrhea.

Rectocolonic papillomata are variable in size—wheat to grape—purplish-red in color, ovoid, pyriform or nipple-like in shape, seldom pedunculated; are numerous, widely distributed and secrete a profuse mucilaginous, blood-tinted, acrid discharge, annoying to the patient because of the frequent evacuations it excites and the accompanying erosions of the mucosa and skin.



Fig. 525.—Anovulvar fibromata operated by the author.

These superficial growths (Fig. 524) are not inclined to malignancy except when attached to adenomata, when they are designated villous tumors.

Condylomas.—External or fragmentary papillomata are usually referred to as *warts*, *vegetations*, or *condylomata* (see Fig. 484); types of growths fully discussed in Chapter XLIV. Papillomata of the skin have individual, diminutive, pedunculated attachments, clubbed or branching extremities; are encountered singly, in groups, or *en masse* (Fig. 485); exude a free offensive discharge which is contagious when the warts are luetic, and in neglected cases the condylomata may conceal the anus and vulva; while neoplasms in the rectum may be single or multiple, they do not overlap or conglomerate, and like growths in the lower inch of the anal canal which assume characteristics of skin warts.

Fibroma.—Fibrous tumors are exceedingly rare in the small intestine and colon, but fibro-adenomata and fibromyomata are occasionally encountered in the lower rectum, at the anus, and upon the labia (Figs. 525, 526) and buttocks in individuals who



Fig. 526.—Keloidal fibroma (Graham).

have undergone multiple operations, or suffer from chronic inflammatory conditions of the bowel complicated by free irritating discharge that dribbles through the anus.

Keloids, large and small, surgical and non-surgical, have been observed ten times by the author in anorectal regions of negroes



Fig. 527.—Keloidal granuloma—tuberculoma before operation.



Fig. 528.—Appearance of parts following excision of keloidal granuloma—tuberculoma (Graham).

(Fig. 526), and twice in white men as secondary complications of fistula, stricture, tuberculosis, and lues of the rectum.

Graham has reported 2 interesting cases—1 keloidal tuberculoma affecting anus, perineum, and scrotum (Figs. 527, 528), and

the other a keloidal fibroma (Fig. 526) excised by him. Uterine fibromata have been known to involve the upper rectum.

Anorectal *fibromata* observed by the author have been single or multiple, ovoid or irregular in shape, overlapping or separated by deep fissure-like cracks, from pea to hen's egg size; usually encountered in close proximity to the anus or vulva, non-sensitive, and appeared as whitish, hard, nodular tumors composed almost entirely of connective tissue that originated in the skin or scar tissue from operation (Fig. 525).

Several adenofibromatous polyps have been encountered, but the author has treated only 4 cases of true rectal fibromata, all of which were attached to the rectal wall, but had no pedicle.



Fig. 529.—Fibromata molluscum.

These tumors originated in the submucosa, were composed of fibrous and slight amount of glandular or muscular tissue, and almost devoid of vessels. In a few instances hypertrophied anal papillæ and thrombosed internal hemorrhoids were converted into fibromata.

The author has handled 2 cases of *Recklinghausen's disease* where numerous sensitive *neurofibromata* (Fig. 529) dotted the perianal region and buttocks, and in 1 of these cases—a woman—similar ovoid and round tumors, variable in size, scattered throughout the rectum, when sectioned were found to contain connective tissue and some glandular tissue.

Fibromata in and outside the rectum seldom secrete, but are

often associated with or caused by offensive discharges from other affections.

Lipoma.—Adipose tumors are fairly common and met with extrarectally in the bowel, and subcutaneously in the perineal, coccygeal, scrotal or labial regions, and buttocks (Figs. 530, 532).

Rectal lipomata may arise from the gut wall, but usually originate in the subperitoneal fat—often congenitally—penetrate the musculature, and force the submucosa and mucosa inward, forming round or lobulated polyps or masses.

Many times the author has excised adipose growths varying from olive to child's-head size, that were smooth, soft, multilocular,



Fig. 530.—Large lipoma of the buttocks removed under local anesthesia (see Fig. 533).

firm, had undergone fibrosis, become cystic, or broken down and discharging. Some neoplasms were superficial and others deep; subcutaneous tumors extended outward or inward toward the rectum, and in 2 cases of the last-named type tumors became infected and pus was evacuated through the rectum, leaving fistulæ.

Lipomata affecting the rectum and perianal region occur at any age in both sexes; are of slow growth, rarely undergo malignancy, cause but little discomfort unless bruised or infected, and seldom recur when cleanly excised. Traumatized, inflamed, and degenerating growths form fibrous attachments that make extirpation difficult. Cystic lipomata show a tendency to return or leave a discharging sinus unless their capsule is entirely removed.

Deep-lying fat tumors may contract, producing depressions in the rectum or dimples upon the skin, or when very large project sufficiently to be observed through the clothing, and in such cases may be globe-like, pyriform, or polypoid in shape.

Myoma.—True myomata are very rare, but *adeno-* and *fibro-myomata* are occasionally encountered in the rectum and rectovaginal septum independently or in connection with uterine involvement. Such tumors may be flat, round, or egg shaped, but are seldom pedunculated.

The author does not remember having observed a typical myoma in the anal region, but has removed neoplasms containing more or less muscular tissue from the rectum.

Angioma.—Growth of this type—abnormal proliferation of the cap-



Fig. 531.—Lipoma resembling testes in case of hairy pigmented nevus that assumed the appearance of a bathing suit (Harry Fox).



Fig. 532.—Enormous tail-like lipoma of the buttocks (Adler).

illaries (Figs. 534, 535)—are congenital, but slowly or rapidly extend later in life. They originate in the perianal skin, extend inward to or involve the rectal mucosa by forming plaques, ovoid or irregular enlargements, reddish—hyperplastic—or dark bluish—cavernous—tumors that bleed profusely when punctured or lacerated, or distend when the circulation is obstructed.

These growths, which contain arterial or venous capillaries and sustaining fibrous tissue, may be small, round, and isolated, or extensive, irregular in shape, and involve the rectum, perianal skin, buttocks, abdomen, and thighs, have a smooth or irregular surface which in exceptional cases is characterized by an abnormal development of hair; the author has observed 2 cases of extensive pigmented nevi (Fig. 534) of the buttocks, one dotted over with fibromata, and the other marked by two or three pedunculated lipomata.

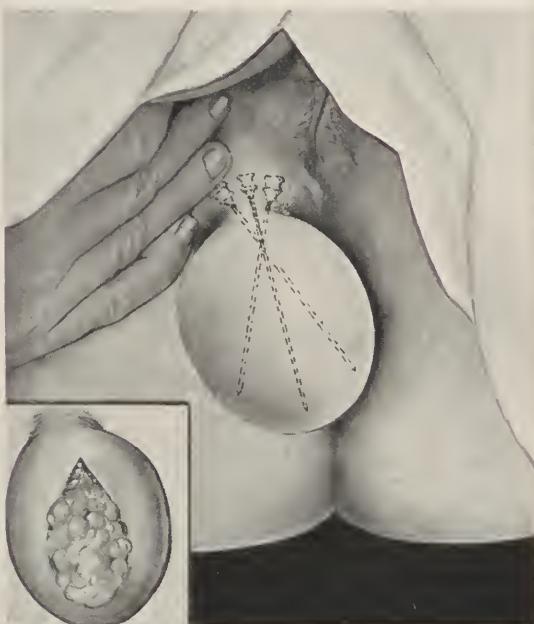


Fig. 533.—Child's-head-size lipoma of buttocks removed by the author under local anesthesia. Insert shows appearance of tumor content.

Birth-marks of the anorectal region cause little or no discomfort—except mentally—unless they encroach upon the anus and rectum, or become inflamed or infected through traumatization by the feces or rubbing of clothing, when hemorrhages may be frequent and difficult to control. The author successfully removed several large internal hemorrhoids by the ligature method in 2 cases where the mucosa and skin were markedly distorted by angiomatic process (Fig. 534), because of which other surgeons declined surgical intervention.

Neither angioma nor nevi are prone to malignant degeneration and seldom return when completely excised and feeding vessels

are destroyed. Rectal angioma may involve a small area or encircle the bowel, and in such cases the mucosa is of a dark purplish hue,



Fig. 534.—Enormous nevus (angioma) involving the buttocks, anus, and rectum. This patient, operated by the author for large hemorrhoids, bled but slightly during and following operation.

thickened, thrown into rugæ, and marked by erosions or ulcers that bleed frequently or profusely and cause anemia or, exceptionally, death (Fig. 535).



Fig. 535.—Angioma-villous tumor that extensively involved the lower rectum and periana region (Adler).

The author has frequently operated for hemorrhage complicating general *varicosis* of the rectum, and has observed but 2 cases of what he diagnosed as true rectal angioma, in both of which

hemorrhages dated from infancy, and the tumors were raised, saucer shaped, convoluted, purple, angry looking, located on the anterior surface of the rectum, and bled freely upon the slightest provocation.

Myxoma.—This, the rarest type of anorectal tumor, is formed principally of mucous tissue; the best known example being that reported by Jones, who removed a large ovoid tumor composed of three lobes, which, upon microscopic examination, were found to be composed of mucous tissue.

Soft, glairy, fragile polyps of childhood are diagnosed as myxomata by some authorities. The author has never encountered a typical myxoma in either adults or children.

Enchondroma.—Cartilaginous neoplasms are hard, round, or cylindric, smooth, glistening, pearly-white tumors having an elastic feel and impoverished blood-supply, that when incised contain serosanguineous fluid, and when sectioned give forth a creaking sound. The author has observed enchondromata twice in the sacrococcygeal region, but cannot recall having operated for true anorectal cartilaginous neoplasm.

Enchondromata may undergo calcareous or cystic degeneration, and are most often encountered in proximity to pelvic, sacral, or coccygeal articulations.

Lymphadenoma.—Lymphomata or lymphadenomata, independent or associated with Hodgkin's disease, develop from lymphoid tissue or solitary glands, and contain branching cell reticula, round-cells, leukocytes, adenoid and connective tissue, and capillaries.

Adenolymphomata are soft, seldom attain great size, may be ovoid or pedunculated, are frequently mistaken for lymphosarcomata, and constitute the most serious type of non-malignant tumors because of their frequent transition into cancer.

Osteoma.—Osseous tumors are never encountered at the anus or in the rectum, but have developed from the sacrum, coccyx, or pelvic bones, and in rare instances grow inward until they encroach upon and obstruct the bowel.

Inflammatory Tumors.—Neoplastic swellings, large and small, variable in contour, located in the perirectal spaces, bowel, retrovesical septum, and at the anus, that are not predominantly glandular, fibrous, muscular, mucous or lymphoid in character, are frequently encountered by proctologists.

Tumors of this type are often the result of local infection, encysted feces, or foreign bodies, catarrhal, inflammatory, or suppurative processes of neighboring structures or organs that extend to

the rectum—*echinococcus*, *bilharzia*, or *actinomycosis* infection, burrowing fistulæ, and end-results of old abscesses.

This class of tumor, the result of chronic fibrinous exudate, forms slowly, is not very sensitive, has an elastic feel, is stationary, and causes partial or complete obstruction. The author has successfully operated on several unimportant and a few cases of serious inflammatory tumors, 6 of which had been previously diagnosed as cancer requiring extirpation.

Neoplasms of this type occasionally the result of perisigmoiditis, mesosigmoiditis, periproctitis, or diverticulitis in neglected instances undergo transitional changes.

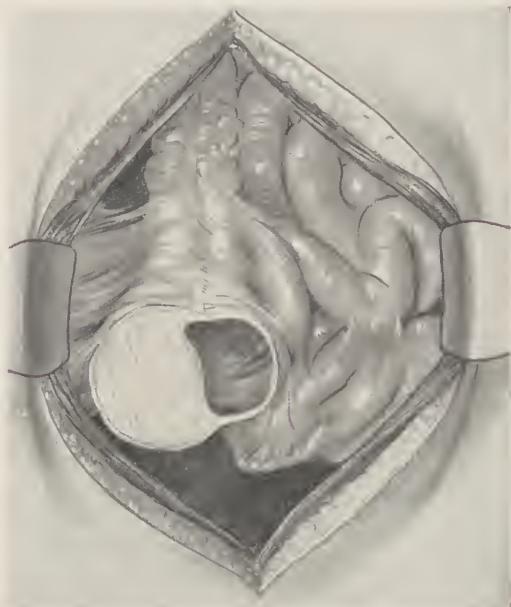


Fig. 536.—Pericolitis complicating neoplastic-hypertrophic tuberculosis that involved the cecum, appendix, and rectum in the author's case.

Neoplastic Tubercular Tumor.—Hyperplastic tubercular tumors (Fig. 536) occasionally encountered in the rectum originate in the *submucosa* and extend into the bowel or perirectal tissues, which are of slow growth, are dense, elastic, covered by a fibrous sheath, variable in size—egg to orange—and benign, though often mistaken for cancer, seldom recur following extirpation, do not cause diarrhea until they degenerate and form crater-like ulcers.

Overlying mucosa is thrown into rugæ and occasionally dotted over with papillomata. Chronic obstructive manifestations are

the chief results. The author successfully extirpated two large neoplastic tubercular tumors involving the cecum, both of which had been mistakenly diagnosed and treated for cancer. For a complete discussion of neoplastic tuberculosis, see Chapter devoted to Colonic Tuberculosis.

Gumma.—Rectal are more frequent than other intestinal gummata, and these luetic deposits, more common in women than men, may be single or multiple, circumscribed or diffuse, ovoid or saucer shaped, originate in the submucosa and later involve other bowel tunics, are non-sensitive, may be marked by superficial or deep ulcers, and are the only tumors that are absorbed through medication.



Fig. 537.—Anal cyst removed under local anesthesia.

The author has observed but three or four rectal gummata, and of these the largest—egg sized—which caused diarrhea, tenesmus, and obstruction, disappeared under mixed treatment.¹

Spina Bifida.—Congenital anterior tumors of this type sometimes compress or rupture into the rectum. For detailed study of the subject the reader is referred to the Chapter devoted to Spina Bifida.

Hypertrophied Anal Papilla.—Papillitis the result of trauma, irritation, or infection causes the anal papillæ at Hilton's white line to enlarge and project into the anal canal or through the anus; such growths may be pointed, cylindric, clubbed or polypoid in form, are reddish at their mucous attachment and white at their tips, and vary from $\frac{1}{8}$ to 1 inch (3.17 mm.–2.54 cm.) or more in length. For

¹ For further discussion, see Chapter XLIV.

detailed discussion of hypertrophied papillæ the reader is referred to Chapter XII.

Parasitic Tumor.—Occasionally neoplasms are encountered in and outside the rectum induced by irritation or infection of parasites, typical instances of which are those resulting from *echinococcus* infection. *Actinomyces*—ray fungus—or *Schistosoma hematobium*, penetrating deeply into tunics of the gut or structures without the rectum, may be the starting-point of a tumor. Parasitic infection has received full consideration in a special chapter.

Cysts.—Succinctly defined, cysts (Fig. 537) are circumscribed sacs distended with fluid or semisolid contents; the latter when lined with epithelium or glandular tissue are designated “retention cysts.”

Clinically, cystomata, which are inclined to pedunculation, result from the degeneration of tumors and their contents which con-



Fig. 538.—Anal cyst. (See method of excising, Fig. 540.)

tain characteristics of the original neoplasm, are retained by sacs of varying thickness and density. *Dermoids* and *hydatids* are ordinarily classed as cystomata.

Anorectal and perirectal cysts are fairly common, may be congenital or acquired, single or multiple, superficial or deep, large or small, and retain their original form or break down and drain into the rectum, bladder, urethra, vagina, or upon the surface through a fistulous tract.

Diminutive and larger *mucous*, *gas*, and *fecal* cysts, the result of an injury or puncturing of mucosa or bowel by an ulcer, foreign body, or parasite, are occasionally encountered, and such tumors are ovoid or round, fluctuating, semisolid, and rarely pedunculated.

Large cysts—egg to child’s head size—with pedicles attached to or penetrating the bowel have caused obstruction, ruptured,

extruded through the anus, or broken off by passage of child's head during labor. Such tumors usually contain albuminous fluid, hair, and other substances. Ovarian, perirectal and sacrococcygeal dermoids, and hydatids not infrequently obstruct, ulcerate, and rupture into the rectum.

Retention or glandular cysts filled with albuminous fluid and sebaceous secretion (Fig. 539), varying from olive to orange size, are not uncommon in the scrotal, vulvar, perianal, and other

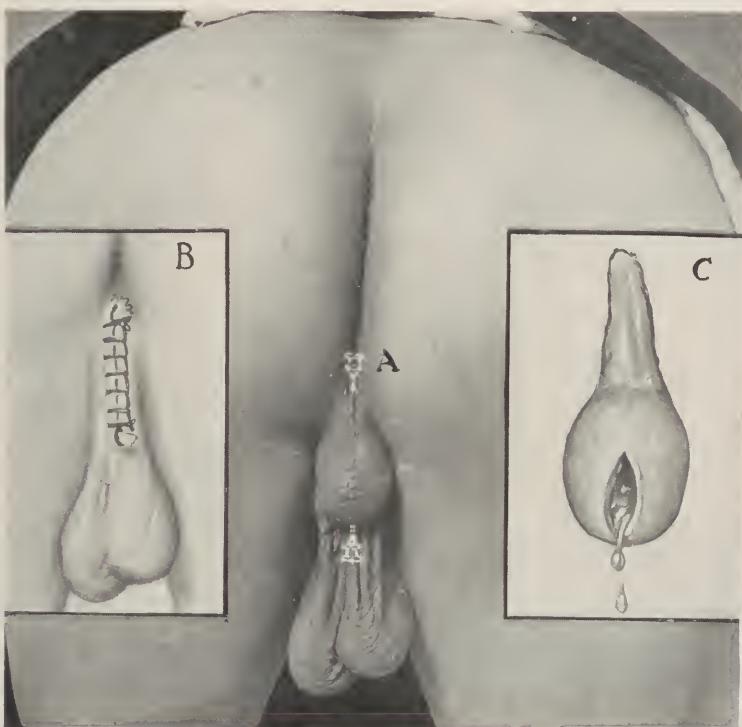


Fig. 539.—*A*, Sebaceous cyst of the perineum. *C*, Appearance of incised tumor. *B*, Wound closed following excision under local anesthesia.

hairy regions. Such swellings are semisolid, fluctuating, globular when recent, and occasionally pendulous when old or partly degenerated, non-sensitive, and freely movable except when inflamed, and exhibit a tendency to recur or continue to discharge following extirpation unless the sac has been completely enucleated.

The author has successfully removed many sebaceous cysts (Fig. 540), one of which required a secondary operation. These inflammatory neoplasms have an impoverished blood supply;

when infected they break down and exude an offensive, irritating discharge admixed with cheesy material.

Dermoid Cysts—Teratomata.—These cystic tumors of the anorectal and sacrococcygeal region are congenital, more common than believed, and contain hair, sebaceous material, teeth, and other fetal elements; may be single or multiple, small or large, —walnut to child's head size or larger—uni- or multilocular, have thick or thin capsules, be located extrarectally, in the bowel, upon the surface of the sacrum or coccyx, or between the anus and coccygeal tip; may be round, lobulated or pedunculated, or exist

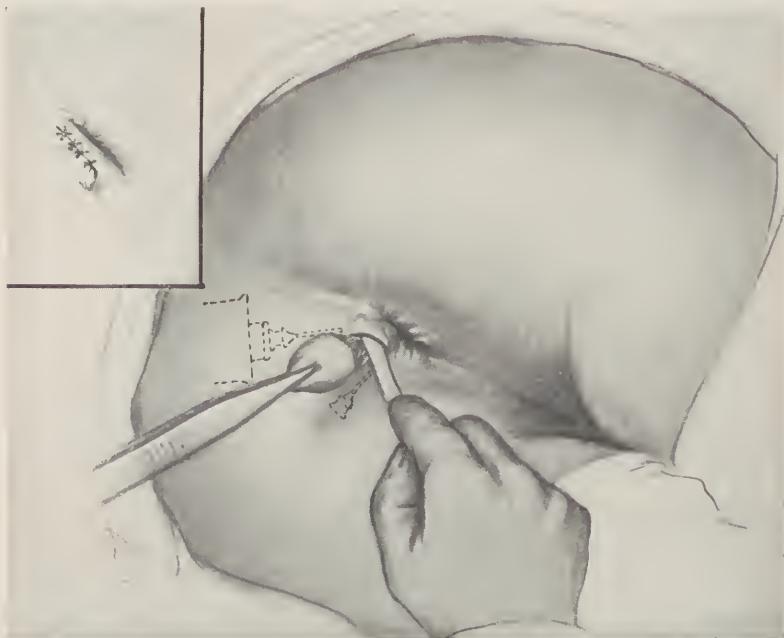


Fig. 540.—Anal cyst (Fig. 538) being dissected out under local anesthesia. Insert shows wound closed and drained.

as sinuses or as simple dermoid cysts situated posteriorly in the median line or sacrococcygeal crease.

These cysts have also been encountered in the rectovaginal septum and perineum, but show a preference for the coccygeal region, often originating in the sacral cleft or persistent neurenteric canal, from which point they extend inward and obstruct or maybe rupture into the rectum, in which case hair in strands, balls or tufts, adipose tissue, sebaceous material, skin remnants, teeth, bone, nails, mammary and testicular tissue, and viscid fluid alone or in combination are evacuated through the anus.

Cases have been reported of dermoid cysts being forced through the rectum during labor. Superficial dermoids in the posterior sacral region usually break down between the ages of twenty and thirty, discharging the hair or forming fistulæ, and in this vicinity the dermoid is often tubular in form, varying from 1 to 3 inches (2.54–7.62 cm.) in length.

Dermoid cysts of the sacrococcygeal and rectal regions are often associated with spina bifida and show a decided tendency to undergo cancerous degeneration unless evacuated or removed early. The author has operated upon 2 intrarectal, 2 perineal, 1 extrarectal, 1 anterior sacrococcygeal, and 35 cases of posterior sacral or coccygeal dermoid cysts (Fig. 541).

Corns.—In several instances the author has excised sensitive corns (Figs. 542, 543) mistaken for epitheliomata. These growths were encountered in tailors who sat upon the floor or table while sewing. In most of these cases the tip of the coccyx curved backward or had only a layer of skin covering it, having no protective cushion of fat.



Fig. 541.—Enormous sacrococcygeal tumor that obscured and partially blocked the anus (Lord).

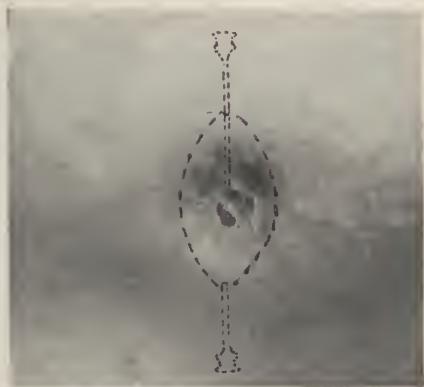


Fig. 542.—Corn over coccygeal tip (mistaken for Epithelioma by surgeon) beneath which was located a sensitive abscess, removed under local anesthesia.



Fig. 543.—Corn located over the coccyx that was excised by the author under local anesthesia after its degeneration into an epithelioma. Both these corns occurred in tailors suffering from posterior deviation of the coccyx who sat on the floor or table while sewing.

Postanal Dimples.—Postsacral superficial and deep fissure-like crevices (Fig. 161), *culdesacs*, or dimples (Fig. 164) in children and young adults indicate the existence of a dermoid cyst or anterior spina bifida. Since the pathology and characteristics of these distortions have received due consideration in Chapter IX the author will not discuss them further.

Sacrococcygeal Tumors.—Congenital tumors (Fig. 541) and appendages in this region which usually attract early attention because of their size are exceedingly interesting, since they may contain different body elements or be present in the form of a supernumerary finger, hand, or foot.

For a closer study of sacrococcygeal diseases, neoplasms, and anomalies the reader is referred to Chapter IX devoted to them.

SYMPTOMS

The degree of discomfort incident to *non-malignant* tumors depends on their *location*, *number*, and *size*, whether or not they protrude, extent of *degeneration*, and *causative* or *complicating* affections.

Neoplasms of the colon and upper rectum cause little annoyance except when obstructingly large, but when situated in the lower rectum or at the anus are constantly felt, induce tenesmus and contractions of the levator ani and sphincter muscles, and are responsible for local and referred pain in the limbs and sacrococcygeal region.

A *single* polyp may exist for a considerable time without the patient's knowledge, or produce uneasy and tickling sensations, or desire for an evacuation when low, while multiple polyps produce a mucous discharge, feeling of weight and fulness, bearing-down pain, frequent desire for an evacuation, and may be responsible for loose stools.

Small polyps are not troublesome, *medium* cause a discharge, tenesmus, and uneasy feeling; while a *large* single polyp or small tumors in the rectum or at the anus are invariably responsible for distressing symptoms—constant desire to stool, prolonged straining, unrelieved sensation following defecation, marked weight and fulness in the bowel, sacrococcygeal neuralgia, pain referred down the limbs, frequent micturition, disturbed menstruation, hyperperistalsis, diarrhea, tympanites, digestive disturbances, and tonic or clonic spasm of the levator ani and sphincter muscles when growths encroach upon the anal canal, and an offensive blood-tinted mucopurulent discharge if the neoplasm has undergone degeneration and crater-like ulcers have formed.

Stationary cause less annoyance than pedunculated tumors because the latter dangle in the bowel, inducing uneasy sensations and muscular irritability, or protrude through the anus and excite sphincteralgia, or undergo venous engorgement, necrotic changes, and slough off.

Benign neoplasms may exist for weeks, months, or years without much change, but when they attain large size are inclined, as result of trauma, to break down or undergo *cancerous degeneration*, in which case they are responsible for local discomfort or pain, and superficial or crater-like ulcers that secrete an irritating discharge containing blood, mucus, pus, bacteria toxins, and *débris*—the amount of which corresponds to the extent of ulcerative process—or resulting abscess, and fistula.

Symptoms of anorectal tumors vary according to the disease causing or associated with them; when secondary to tubercular, entamebic, bacillary, syphilitic, or catarrhal coloproctitis, *diarrhea*, *hemorrhage*, and *gastro-intestinal disturbances* are marked; when hemorrhoids, hypertrophied papillæ, fistula, and abscess are in evidence, manifestations peculiar to these lesions are observed.

Rectal polyps undergoing or changed into cancer have an offensive odor, and dermoids or cysts that rupture are characterized by the *discharge* of an albuminous fluid, hair, or sebaceous material.

Large growths of the sigmoid flexure or rectum produce partial or complete *obstruction* accompanied by constipation or obstipation, alternating with diarrhea, abdominal distention and gas, incessant desire for an evacuation accompanied by severe straining, fecal impaction, restlessness, fast, thready pulse, muscular rigidity and usual symptoms of serious bowel blocking, manifestations occasionally relieved spontaneously by breaking or sloughing off of the neoplasm.

Innocent tumors, except when complicated by colitis, cause but a slight loss in weight, and both benign and cancerous growths occasionally induce intussusception, invagination, or rectal procidentia through dragging the gut down.

Papillomata and villous adenomata readily ulcerate or break off and cause slight or profuse hemorrhage, but other non-malignant neoplasms seldom bleed unless they degenerate into cancer when they are accompanied by metastases.

Myxomata or villous tumors incite a profuse, bloody, mucilaginous discharge that frequently contains pieces of the fragile neoplasm. *Papillomata* and *adenomata*—polyposis—when numerous and located in the colon and rectum are responsible for frequent

movements, largely composed of blood-tinted, glairy mucus, digestive disturbances, loss of weight, and cachectic appearance.

Hypertrophied anal papillæ are responsible for intense itching, sphincteralgia, and crawling sensations in the anal canal, and appear as diminutive, pointed, whitish, or clubbed polyps when extruded.

External tumors, such as cysts, lipomata, etc., induce little annoyance unless traumatized, inflamed, or broken down, when the neoplasm is reddened, painful to the touch, and partly or completely fluctuating.

Condylomata—Papillomata, Warts.—Syphilitic, non-syphilitic (Fig. 484), and tubercular warty excrescences exude an offensive irritating discharge that galls the mucosa and skin, incites sphincteralgia, and causes discomfort or pain during defecation, when sitting or rubbed by clothing.

Broken-down tumors or cysts in the anorectal or sacrococcygeal region, according to their content or presence of infection, discharge pus, sebaceous matter, teeth, etc., hairs following rupture or ulceration of overlying integument.

DIAGNOSIS

Though easily diagnosed, benign anorectal tumors are frequently confused with cancer, hemorrhoids, procidentia recti, and hypertrophied anal papillæ. *Innocent polyps* possess a typical pedicle and soft pliable, superficial attachment, while *malignant* growths have a firm, broad, deeply infiltrating base; the *chances of neoplasms being benign increases in proportion to the degree of their pedunculation*.

Cancers are characterized by their tendency to attack elderly persons, cachexia, metastasis, rapid loss of weight, hemorrhage, pain, offensive discharge, and early obstructive manifestations; *innocent* tumors, by their slow growth, slight discomfort, slight bleeding, unimportant loss of weight, and absence of profuse discharge except when degenerating or complicated by coloproctitis; benign tumors lack metastases and tend to occur in persons between twenty and fifty years of age.

Hemorrhoids are multiple, have a globular contour, broad attachment, purplish hue, and are soft; compressible tumors are located in the anal canal. *Procidentia recti* is differentiated from polyps by the cone-shaped creased surface, circular attachment, softness, and central slit.

Enlarged or *hypertrophied anal papillæ* are pyramidal in form, reddish at base, and white at apex, pointed or club shaped, and located above Hilton's white line.

Protruding tumors are practically always benign, since malignant extrude through anus only in the earliest stage when complicating procidentia rectæ.

Condylomata—warts—are easily distinguished by their diminutive size, pinkish appearance, clubbed distal extremity, pedunculated attachment (Fig. 484), offensive secretion, and a history of gonorrhea, syphilis, or other discharge known to incite hypertrophic changes in the skin. *Masses*, the result of conglomerate accumulation of these growths (Fig. 485), do not in any way resemble any tumors in the anorectal region.

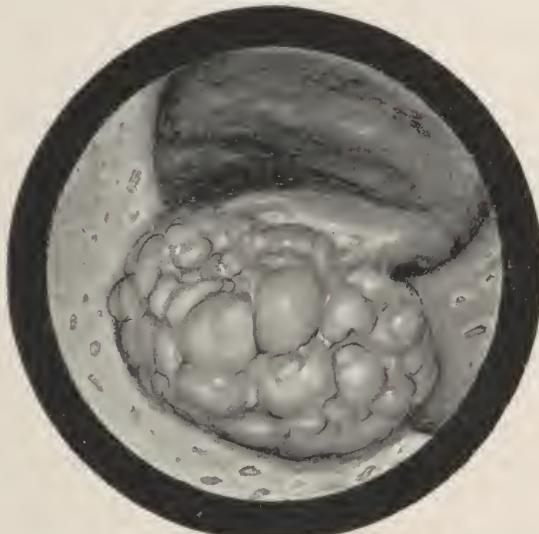


Fig. 544.—Proctoscopic view of large adenoma extruding through the rectosigmoidal opening that complicated follicular coloproctitis.

Cysts (Fig. 537) are diagnosed by their soft fluctuating feel, and other *external tumors* through their semisolid or firm consistence and smooth or lobulated contour.

Posterior sacrococcygeal neoplasms are indicated by a postanal dimple, a slight discharge exuding from a shallow fistula showing a tendency to alternately open and close.

Spina bifida and *coccygeal tumors* are congenital, large, and easily diagnosed, since they in no way resemble other neoplasms.

Low-lying polyps are readily recognized because they may be seen projecting through the anus upon separating anal margins, or through the anoscope (Fig. 544), and can be digitally examined.

By examining tumors with the fingers one can determine

whether they are *hard*—fibrous—or *soft*—adenomatous, papillomatous, or villous—and their *color* noted, since fibrous are white and other innocent growths are of reddish or dark purplish hue.

Neoplasms situated above the anal canal are detected with the finger during straining, by inspection through an illuminated pneumatic proctosigmoidoscope, palpating the bowel through the vagina or abdominal wall, or palpating bimanually the colon or sigmoid flexure, which has a sausage-like or nodulated feel in the presence of multiple, large adenomata—polyps.

Proctoscopic examination shows adenomata hanging by pedicles, singly, or grouped like a bunch of grapes; papillomata as raspberry-like growths; innocent tumors undergoing cancerous changes as indurated, nodulated, semipedunculated tumors with or without degenerative crater-like ulcers; a highly congested or ulcerated mucosa when benign neoplasms are secondary to catarrhal or specific coloproctitis.

From what has been said there is no excuse for not recognizing neoplasms in the rectum and lower sigmoid; sometimes polyps of the colon cannot be diagnosed upon clinical manifestations supported by rectal and abdominal examination, and laparotomy with direct inspection and palpation of the gut is necessary.

Benign tumors can usually be differentiated by macroscopic, but in borderline cases section and microscopic examination is necessary to determine their structural composition and innocence or malignancy.

Where papillomata and adenomata are secondary to acrid discharges and stools or inflammatory disease feces are analyzed or microscopically examined to determine whether *coloproctitis* is catarrhal, tubercular, entamebic, bacillary, syphilitic, balantidic, or helminthic, and the patient submitted to tuberculin and Wassermann reaction tests with a view of ascertaining whether he is tubercular or luetic, and the blood examined for excessive eosinophilia which indicate parasitic infection.

TREATMENT

A spontaneous cure of pedunculated non-malignant growths follows when they are broken off by feces during defecation, or when tumors are caught in the sphincter and amputated by pressure necrosis.

Low-lying growths in the anal canal or that extrude through the anus are easily removed by (*a*) ligation and amputation (Fig. 546, *A*); (*b*) crushing pedicles with an angiotribe followed by excision

(Fig. 556); (c) clamping growth, cutting away portion external to clamp, and cauterizing stump, and (d) excising neoplasm by elliptic incisions about its attachment, suturing, and draining the wound (Fig. 546, C), or permitting it to heal by granulation.

High or polyps located in upper rectum and sigmoid are not accessible to above procedures and must be destroyed or extirpated with (1) pressure forceps (Fig. 550), (2) snare (Fig. 548), (3) angiotribe (Fig. 446, D), (4) attaching Gant valve clamp to tumor pedicle (Fig. 552), (5) torsion (Fig. 547), (6) electrolysis, (7) cautery, (8) fulguration (Fig. 554), or (9) excising the involved gut segment.



Fig. 545.—Fibro-adenoma withdrawn from rectum with fingers, anesthetized, and ready for ligation and excision.

Electrolysis is unreliable; *torsion* (Fig. 547) is objectionable because twisting often lacerates the mucosa (Fig. 547) and causes hemorrhage; *angiotribes* are undesirable since cumbersome, and they cannot be introduced through a proctoscope; *snaring* (Fig. 548) is objectionable owing to difficulty in adjusting the wire loop and danger of subsequent bleeding; and removal of polyps by the *clamp* and *cautery* method is not desirable because it is difficult and often followed by hemorrhage.

Larger polyps in the upper rectum are most satisfactorily destroyed by seizing and clamping their attachment with *pressure*

forceps (Fig. 550) through a large operating proctoscope, following which the latter is withdrawn, detachable handles removed, and forceps are left projecting through the anus. The instrument causes but slight discomfort when the patient remains quiet in bed, but when forceps incite pain or sphincteralgia, suffering is quickly relieved by a morphin, gr. $\frac{1}{4}$ (0.016), and atropin, gr. $\frac{1}{150}$

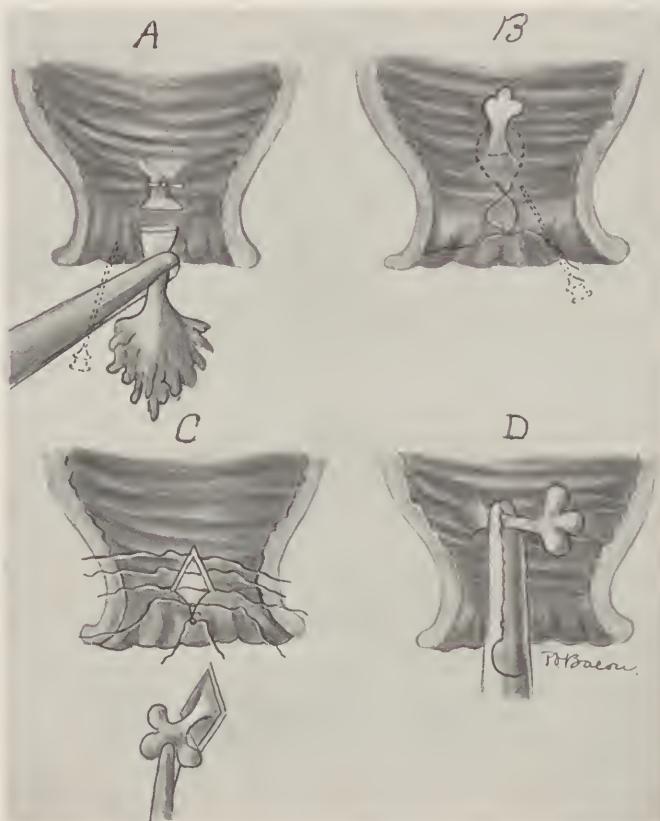


Fig. 546.—Methods of removing polyps: *A*, By ligation; *B*, encircling them with purse-string suture preceding amputation; *C*, excision and suture; *D*, angiotribe and excision.

(0.0004), injection or suppository. The forceps cause necrosis and sloughing off of the tumor in from three to five days, when the patient is permitted to leave his bed.

Clamp Operation.—Small- and medium-sized pedunculated tumors in the middle and upper rectum or lower sigmoid are removed in the office by exposing them through an operating proctoscope and applying a *Gant valve clamp* (Fig. 552) after the manner

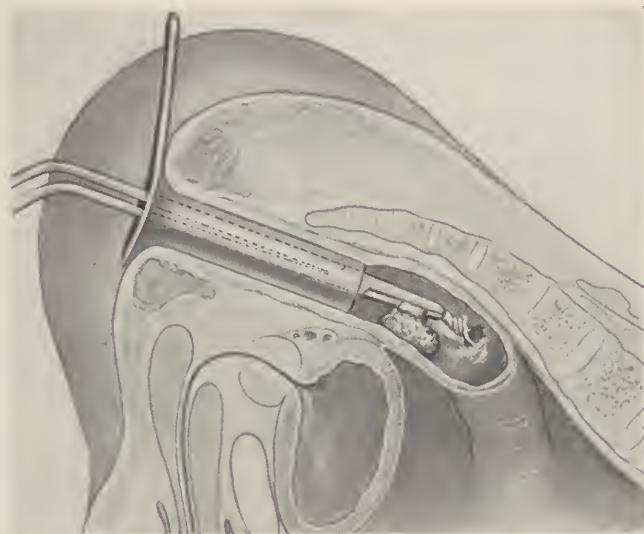


Fig. 547.—Removing polyp from lower sigmoid by torsion. A dangerous procedure, frequently followed by hemorrhage.

shown in Fig. 551. The clamp cuts its way through the pedicle in from one to six days, depending on its toughness and strength of the clamp. The instrument causes no discomfort except when

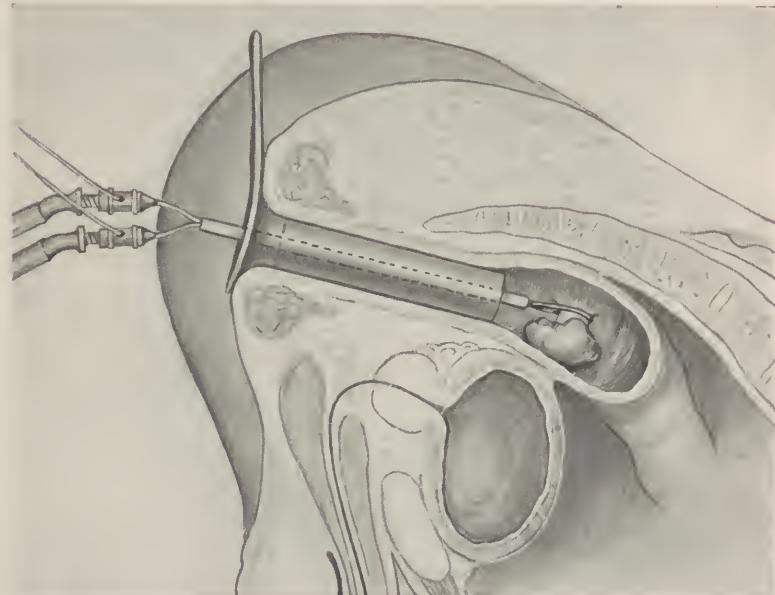


Fig. 548.—Removing polyp with electric snare.

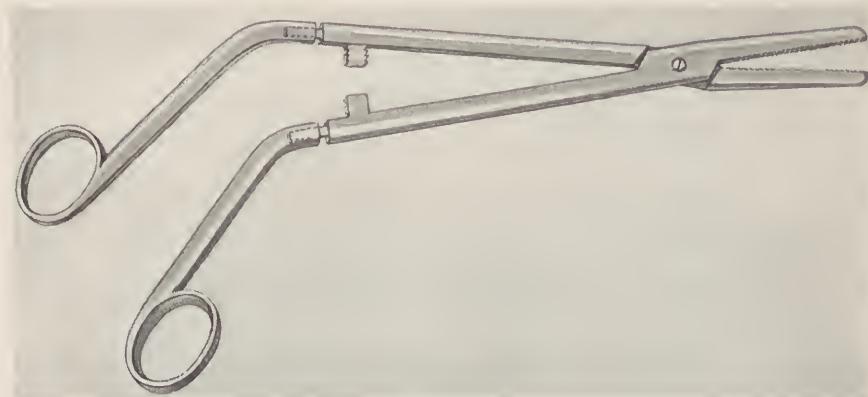


Fig. 549.—Author's pressure forceps having detachable handles. This instrument is employed for controlling hemorrhage, removing polyps, and excising by pressure necrosis the gut following colostomy.

its lower end rests on the upper extremity of the anal canal or incites spasm of the levator ani or sphincter muscle.

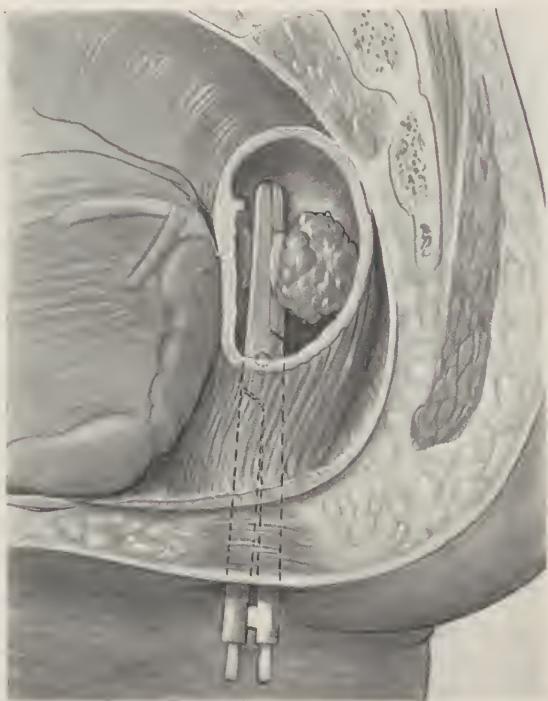


Fig. 550.—Removing polyp with pressure forceps left *in situ* following removal of the detachable handles.

Ligature Operation.—The ligature is the operation (Fig. 553) of choice for growths within reach because it is quick, safe, and



Fig. 551.—Technic of adjusting the author's valve clamp to the pedicles of polyps with a special applicator forceps.

effective. Tumors having large tough pedicles are transfixed and doubly tied like thick piles (Fig. 347) because when they are en-

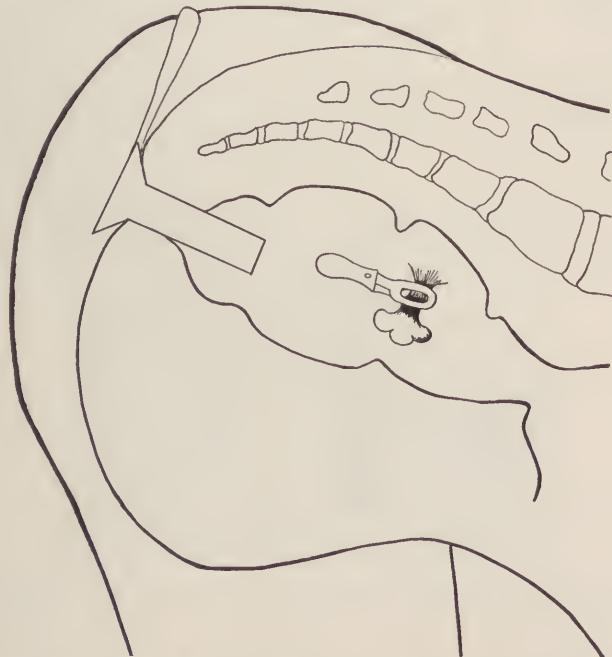


Fig. 552.—Removal of polyp by pressure necrosis using a Gant valve clamp.

circled with a single thread circulation may not be completely blocked and the ligature fails to cut its way out, leaving the growth

dangling; hemorrhage occasionally ensues where the linen ligature slips from a short stump or it has not been properly tied.



Fig. 553.—Diminutive skin polyp filled with fat, ligated, and excised under local anesthesia.

Fulguration (Fig. 555) and cauterization, using a regulated high-frequency spark with aid of proctoscope, anoscope, or slide speculum (Fig. 554), is effective in this class of cases, and the author has rarely encountered a benign tumor of the rectum that has not



Fig. 554.—Technic of destroying polyps—adenomas—through the proctoscope by applying high-frequency fulguration to their pedicles.

disappeared following from three to ten treatments, depending on size of the growth and density of its structure.

Applications vary from one minute in *soft*, to ten minutes for *fibrous* growths; the former shrink and disappear after slight and

the latter following thorough cooking or burning with a cautery so the heat may penetrate all parts of the tumor. This procedure is preferable to cauterization with an electric or Paquelin cautery in all except tumors undergoing malignant changes.

Attractive features of the *fulgurating* treatment of anorectal growths are: It appeals to the patient by avoiding operation; can be practised in the office instead of hospital; is painless for tumors in the mucosa; accomplishes a quick cure; is not accompanied by hemorrhage or followed by the formation of cicatricial tissue.

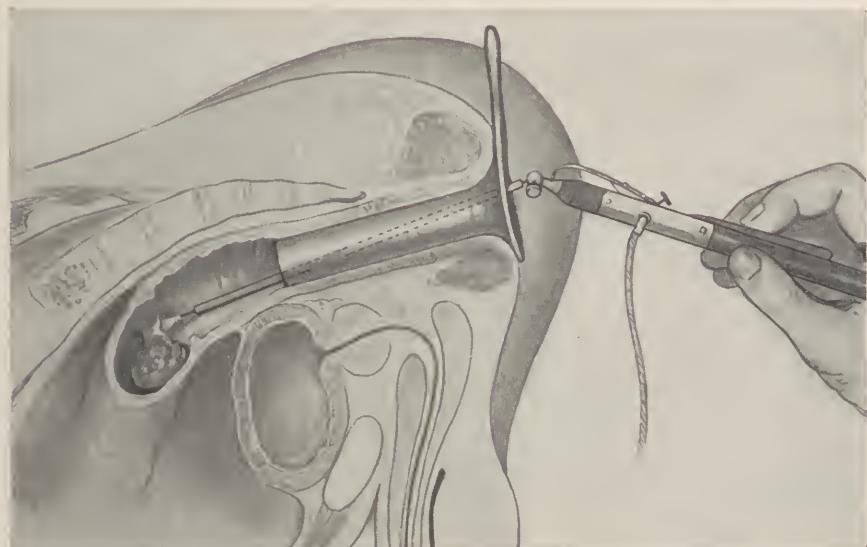


Fig. 555.—Destroying high-lying polyp through proctoscope by fulguration—high-frequency spark.

Pedunculated growths can usually be made to slough off by one or two fulgurations applied to the pedicle over its attachment (Fig. 555).

When the spark does not touch, normal mucosa scars are avoided; for when confined solely to the tumor the growth shrinks or drops off without causing material change in the mucous membrane.

Fulguration is equally useful for destroying ordinary warts, verruca, tuberculosis, skin polyps, moles, hypertrophied anal papillæ, condylomata lata and acuminata, and mucous cysts of the anal canal. When hypertrophied papillæ and skin growths are fulgurated pain ensues unless they are previously infiltrated with a local anesthetic.

Clamp and Cautery Operation.—Polyps and adenomata attached to the lower rectum are quickly excised in the manner shown in the accompanying illustration (Fig. 556).

Excision.—In exceptional instances benign tumors—tubercular neoplasms and gummata—of the rectum or anal canal extensively involve or completely encircle the bowel, making complete *extirpation* of the rectum imperative. In such cases the involved rectum may be excised by *inferior*—perineal excision, *superior*—sacral excision—Kraske's operation or *abdominoperineal excision*.

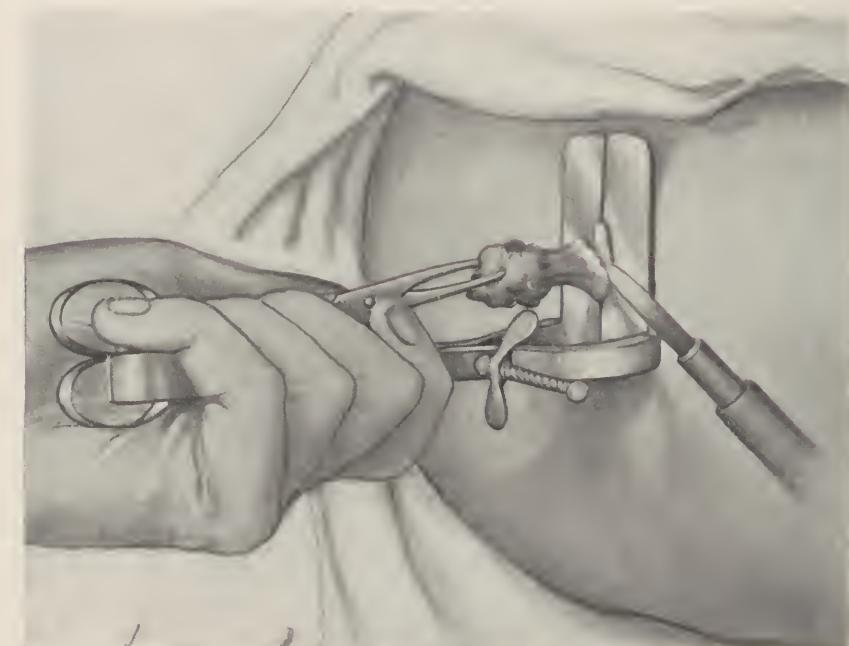


Fig. 556.—Author's method of removing polyps with cautery when his hemorrhoidal clamp is employed.

—combined operation, procedures for a description of which the reader is referred to chapters devoted to the surgical treatment of anorectal cancer.

Occasionally tumors are satisfactorily removed through *elliptic* incisions (Fig. 546, C) and suture, or leaving the wound to heal by granulation provided the anal canal is split and a drain is inserted to forestall infection.

Condylomata are quickly disposed of by infiltrating underlying integument with eucain and snipping off the growths (Fig. 488).

Sacral dermoids are exposed through a median incision and

excised or curedt out with their sac, after which the wound may be closed or left open, since it is superficial.

Colectomy is indicated in aggravated cases of multiple adenomata not cured by irrigation and fulguration, and where tumors are undergoing malignant degeneration. For the technic of this procedure see Colectomy and Sigmoidectomy for Cancer of the Colon.

Dermoids and other tumors of the anorectal region are dissected out, leaving a clean wound if possible, but when infected or the entire sac cannot be enucleated the wound is partially sutured and drained with gauze.

Inflammatory tumors due to old abscesses or chronic fistulæ are *incised*, *curedet*, and *drained*; when caused by encysted foreign bodies the offending object is dissected out and the wound sutured



Fig. 557.—Polyposis—multiple rectocolonic polyps secondary to amebic colitis.

if in the skin, and drained and permitted to heal by granulation when in the rectum.

Postanal dimples are *excised* by means of elliptic incisions and closure of wound with catgut sutures.

Other Operative Measures.—Single, multiple, widely scattered polyps and other benign tumors of the rectum and lower sigmoid are destroyed by above-mentioned procedures, but in the presence of numerous papillomata (Fig. 522) or polyps they are ineffective, since new growths form as quickly or faster than old ones are eliminated. In such cases the disease to which the neoplasms are *secondary*—usually tubercular, syphilitic, gonorrhreal, entamebic or bacillary coloproctitis—must be relieved or corrected as a prophylactic measure, for when this is done and tumors are removed the patient is permanently cured.

Inflammatory and ulcerative lesions in the lower bowel are

controllable in most instances by copious daily ichthyol, balsam of Peru, boric acid, or argyrol 4 per cent. *irrigations*, which heal the lesions and often cause diminutive new growths to disappear through lessening irritation of the mucosa induced by diarrheal stools, acrid discharges, pathogenic bacteria, and toxins.

When for any reason the solution cannot be made to reach all parts of the colon, *appendicostomy* or *cecostomy*—see Chapter XCIII, Vol. III—is indicated, that the bowel may be frequently cleansed and medicated by through-and-through colonic irrigation.

Ileostomy or *short-circuiting*—ileorectostomy or sigmoidostomy, see Chapter XCIV, Vol. III—is demanded in obstinate cases not cured by *appendical* or *cecal* irrigations because the mucosa is so deplorably irritable, inflamed, or ulcerated that colonic treatments are useless unless the bowel is put completely at *rest* by diverting feces from the colon and rectum.

Occasionally *colostomy*—see Chapter XCIV, Vol. III—is resorted to for this purpose, an artificial anus being established above the inflammatory lesions and polyps; but appendicostomy, cecostomy, or short-circuiting—colonic exclusion—are preferable to colostomy, barring exceptional cases, because of the disgusting features of an anus in the side.

Chapter XLVIII

Gas, Fecal, and Mucous Cysts of the Anorectal Region

HAVING considered other varieties of anorectal non-malignant cysts and growths, the author will briefly discuss anorectal *gas*, *fecal*, and *mucous* cysts, conditions rarely mentioned in literature, but which are occasionally encountered by the proctologist.

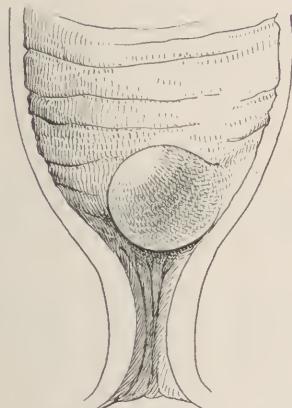


Fig. 558.—Sac resembling polyp distended with gas.

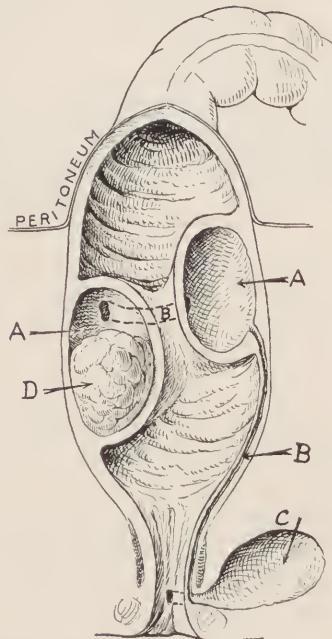


Fig. 559.—Multiple cysts: *A*, Complicated by *B*, fistulæ; *C*, abscess, one of which, *D*, contained a fecal concretion.

Gas cysts vary in size, are pliable, non-sensitive swellings (Fig. 558) that displace the mucosa inward and contain intestinal gas that has entered the sac through a small puncture or opening which closed before it escaped.

Fecal cysts (Fig. 560) small and large may be superficial and also bulge the mucosa outward, or be deep when extrarectal, and are formed through the accumulation of feces reaching the sac

through an ulcer or puncture wound made by an instrument, fish bone, or foreign body.

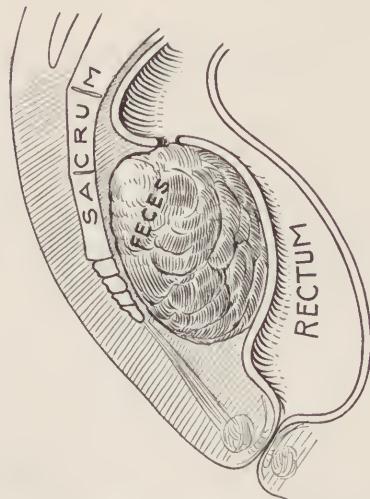


Fig. 560.—Large cyst distended with feces.

Mucous cysts (Figs. 560, 561) have a glassy appearance, resemble and are formed similarly to gas cysts, but instead of air contain fluid or inspissated mucus.

SYMPTOMS

Gas and *mucous* cysts are non-sensitive, but induce discomfort, feeling as if something was in the rectum, fulness in the anal canal, and slight sphincteralgia.

Fecal cysts when superficial and small create the same symptoms as gas or mucus-filled sacs, but when extrarectal and distended with hardened feces induce considerable discomfort or dull aching pain, and irregular temperature when infected.

DIAGNOSIS

Gas, mucous, and superficial anorectal fecal cysts are readily discovered by digital and proctoscopic examination and recognized by their globular appearance, absence of tenderness, and glassy white if mucus or gas, and brownish color when distended with feces.

Extrarectal fecal cysts or diverticula are diagnosed by palpation, the mass being indentable, and locating and probing them through their openings exposed through the anoscope or proctoscope.

TREATMENT

Gas and mucous cysts are *incised*, evacuated, and drained, or seized with forceps and *excised* with scissors under local anesthesia, when the wound is sutured (Fig. 561) or permitted to heal by granulation.



Fig. 561.—First (left) and second (right) steps in the author's operation of excising mucous and gas cysts of the anal canal under local anesthesia.

Extrarectal fecal cysts are treated as diverticula by splitting them and the rectum below, which enables one to evacuate their contents, curet, cauterize, or enucleate the sac, and freely drain the wound.

Below the author has tabulated and discussed 9 cases of gas, mucous, and fecal cysts which give a very good idea of these unusual types of non-malignant anorectal tumors.

AUTHOR'S NINE CASES OF ANORECTAL GAS, MUCOUS, AND FECAL CYSTS

Number cases.	Sex.	Age.	Variety and complications.	Number cysts.	Location.	Operative result.
1	M.	36	Submucous gas cyst.	1	Upper anal canal.	Complete recovery in two weeks.
2	F.	35	Submucous gas cyst.	2	Anal canal.	Complete recovery in one week.
3	M.	49	Submucous gas cyst.	1	Ampulla.	Complete recovery in three weeks.
4	M.	5	Small extrarectal fecal cyst.	1	2 inches above the anus.	Complete recovery in two weeks.
5	F.	40	Submucous fecal cyst.	1	Upper margin of anal sphincter.	Immediate recovery.
6	M.	51	Large extrarectal fecal cyst opening into rectum.	1	Between rectum and coccyx.	Complete recovery in four weeks.
7	F.	14	Mucous cyst.	1	Ampulla.	Prompt recovery.
8	M.	28	Mucous cyst.	1	Anal canal above anus.	Immediate recovery.
9	M.	27	Fecal cyst.	1		Recovery.

Case 1.—Submucous Air or Gas Cyst.—Robust male, age thirty-six. History negative until present trouble, barring swallowing of fish bone two months previously. Complained two weeks of rectal tenderness, sensation of fulness, and blocking in large bowel. Thorough digital and proctoscopic examination revealed nothing but a smooth, ovoid, pliable, blubber-like non-sensitive cyst (Fig. 561) situated at the upper extremity of the anal canal, which it filled. *Diagnosis:* Submucous air cyst.

Treatment.—The cyst was freely incised and a fish bone removed. Remainder of the sac was trimmed off and the wound drained with gauze. Complete recovery in two weeks.

Case 2.—Submucous Air or Gas Cyst.—Delicate female, thirty-five years, previously healthy, noticed a sensation of fulness above the anus and began to have an almost constant desire to stool. By digital examination a smooth, resistant, filbert-sized, non-sensitive swelling was detected on the left wall of the anal canal above the anus. Viewed through the proctoscope it resembled a large translucent bead. *Diagnosis:* Submucous air cyst.

Treatment.—Incision and drainage. Wound healed in one week.

Case 3.—Submucous Air or Gas Cyst.—Male, aged forty-nine years, who had suffered one year from follicular coloproctitis, diarrhea or loose movements alternating with constipation and mucus, but no pus or blood in the stools. During the previous week his rectum annoyed him owing to sensations of fulness, blocking, and a desire to defecate, sphincteralgia, and frequent micturition. Digital examination revealed a smooth, pliable disk or inverted saucer-shaped tumor, half-dollar size, projecting above surrounding mucosa and situated at the upper funnel-shaped entrance to the anal canal to the left of the median line posteriorly.

Through the proctoscope it presented a bulb- or bladder-like appearance, looking like tissues subjected to infiltration anesthesia. The patient was requested to strain, and as he did so the swelling pushed into and obstructed the anal canal. Upon being pricked with a bistoury it shriveled up like a punctured blister. *Diagnosis:* Air or gas cyst.

Operation.—The tumor was clamped at its base with pressure forceps, excised external to them, and the stump cauterized and a drain inserted. Thereafter the wound was cleansed and treated daily with ichthyoöl, 15 per cent.; complete cure in three weeks.

Case 4.—Diminutive Extrarectal Fecal Cyst—Diverticulum.—Boy, five years of age, suffering from intense pain at the anus, pruritus, sphincteralgia, tenesmus, frequent micturition, broken

sleep, extreme nervousness, tendency toward convulsions, and spastic constipation. Thorough examination under gas anesthesia showed upper rectum normal except for scybalæ and a congested area in the lower anal canal in which a small opening was detected. Insertion and withdrawal of a probe demonstrated a cavity filled with impacted feces. On finger palpation a firm tumor, hazelnut in size, was detected lying outside the bowel to the left 2 inches (5.08 cm.) above the anus. Pus was not observed on adjacent mucosa. *Diagnosis:* Fecal cyst.

Treatment.—The rectal wall over and the sphincter muscle below the swelling were incised, the fecal concretion removed with a scoop, and a drain introduced. Thereafter the wound was dressed daily by cleansing and inserting a light drain. In two weeks the rectum was healed and the child was well.

Case 5.—*Submucous Fecal Cyst.*—Female, forty years of age; previous history of healed fistula. Recently troubled with tingling and feeling of some small object near the anus, not expelled by defecation, that incited sphincteric contractions. Digital examination revealed a small, smooth, movable, slightly sensitive tumor beneath mucosa overlying the sphincter. *Diagnosis:* Submucous fecal cyst.

Treatment.—Incision and removal of a fecal concretion, wheat-grain size, which immediately relieved all rectal manifestations.

Case 6.—*Large Extrarectal Fecal Cyst—Diverticulum.*—Male, aged fifty-one; negative history excepting constipation and intestinal auto-intoxication, whose rectum had occasionally troubled him during the last three months, there being sensations of fulness, obstruction, and bearing down in the lower rectum slightly relieved by defecation, which was painful. On two occasions following the evacuation of stone-like fecal concretions symptoms disappeared. Digital examination revealed a firm, nodular, movable, indentable tumor, hen's egg size, located outside the rectum, and an opening finger size through which a fecal concretion could be felt (Fig. 562). Seen through a proctoscope the swelling bulged the bowel sharply inward and was situated between the rectum and anterior surface of the coccyx. Neither diverticulum nor mucosa showed pus. *Diagnosis:* Extrarectal fecal cyst or diverticulum.

Operation.—Following infiltration anesthesia with eucain, $\frac{1}{8}$ per cent., an incision was made posteriorly through the rectal wall and sphincter into the diverticular cavity, after which the fecal concretion was removed and the sac curedt, irrigated, and packed with gauze to arrest bleeding and provide drainage. Subse-

quently the wound was cleansed and drained four weeks, as after fistula operations, the patient making a prompt and permanent recovery.

Case 7.—Tube-like Diverticulum in the Anal Canal Filled with Feces.—Male, twenty-seven years of age, healthy except for rectal trouble of six months' duration, complained of periodic pain, itching, sphincteralgia, and constipation. Digital and anoscopic examination revealed a tube-like pocket, lead-pencil size, $\frac{1}{2}$ inch (12.70 mm.) in depth, which tracked from an opening in the mucosa located posteriorly in the median line at the sphincteric juncture into the perirectal space. The pocket, which did not contain pus, was packed with feces, which were removed with curet and irrigation. Manifestations subsided for several days and gradually re-



Fig. 562.—Large fecal cyst incised, curedt, and drained under local anesthesia.

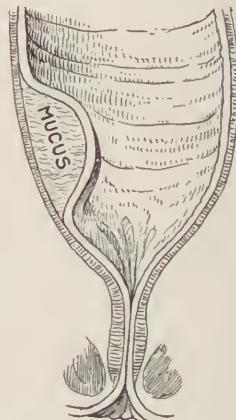


Fig. 563.—Mucous cysts of the rectum.

appeared, and again abated following freeing the sac of feces, to recur shortly afterward.

Operation.—The author's angular grooved director (Fig. 261) was introduced into the pocket, pushed downward until the skin bulged, when overlying tissues anesthetized with eucain $\frac{1}{8}$ per cent. were severed; the wound was subsequently dressed as after blind internal fistulae operations. The patient was confined to the house for two, and completely recovered in ten, days.

Case 8.—Mucous Cyst.—Female, fourteen years of age, who for two weeks complained of uneasiness in the rectum. With the finger a globular fluctuating swelling, pigeon-egg size, was located on the left wall of the ampulla 3 inches (7.62 cm.) above the anus (Fig. 563). Through the proctoscope a glassy, globe-shaped swelling

presented that projected into the gut lumen, and which on palpation appeared to contain fluid.

Treatment.—The cyst walls composed of mucosa were excised by elliptic incision and the sac was found to contain only mucus. The wound was drained and permitted to heal by granulation, the patient having no further trouble.

Case 9.—*Mucous Cyst.*—Male, aged twenty-eight, troubled with follicular coloproctitis, suddenly noticed discomfort and swelling in the lower rectum. By digital and proctoscopic examination a glassy-looking, pea-sized cyst was detected in the anal canal above the sphincter. When removed with scissors and examined the cyst walls were found to be thin, tissue-paper-like, and formed of superficial mucosa, and the contents consisted of pure mucus. The patient made a prompt recovery.

Anterior Rectocele — Diverticulum with Uterine Procidentia Simulating Fecal Cyst.—Female, age sixty, constipated, complained of rectal and vaginal fulness partially relieved by defecation, which was complicated by uterine procidentia and straining. Digital examination and inspection of the parts showed a large, fist-sized pouch—proctocele—anteriorly, in which feces had collected (Fig. 566). Evacuation of the ulcerated sac brought forth semisolid fecal matter and scybala.

This case has been reported because of its resemblance to a fecal cyst.

Treatment.—Following anterior fixation of the uterus the rectocele was eliminated by removing longitudinal sections of the rectovaginal septum and suturing the wound transversely with two lines of chromicized catgut sutures, one placed in the rectum and the other in the vagina, to take up the slack. The wound healed promptly and the patient was cured of his constipation and discomfort.

Chapter XLIX

Rectal Diverticula, Diverticulitis, and Peridiverticulitis

General Remarks.—Having defined and fully discussed the etiology, pathology, symptoms, diagnosis, and treatment of *diverticula*, *diverticulitis*, and *peridiverticulitis* involving the small intestine, colon, and sigmoid flexure in Chapter LXXXV, Vol. III, it remains for the author here to consider rectal diverticula (Fig. 564), which are less common and more difficult to cure.

The author has treated 9 patients for anorectal diverticulitis—7 males and 2 females—whose ages ranged from eighteen to sixty years.

AUTHOR'S NINE CASES OF RECTAL DIVERTICULA

Number.	Sex.	Age.	Variety and complication.	Number diverticula.	Location.	Result of operation.
1	M.	27	Tube-like diverticulum of anal canal.	1	Juncture of sphincters.	Recovery in ten days.
2	M.	45	Suppurative diverticulum.	1	Ischiorectal fossa.	Recovery in eight weeks.
3	F.	49	Diverticulum simulating chronic abscess.	1	Rectal ampulla.	Complete recovery in six weeks.
4	M.	50	Diverticula previously mistaken for cancer.	2	Rectal ampulla.	Complete recovery in two months.
5	M.	30	Rectal pouch (diverticulum) from anterior coccygeal displacement and perforation of the rectum.	1	Posterior rectal wall.	Prompt recovery.
6	F.	60	Anterior rectocele with pouch containing encysted feces.	1	Rectovaginal septum.	Marked improvement.
7	M.	26	Posterior diverticulum due to absence of coccyx and constipation.	1	Posterior septum wall.	Temporary fecal fistula, complete recovery in six weeks.
8	M.	18	Anterior diverticulum (pouching of rectum).	1	Anterior septum wall.	Marked improvement in three weeks.
9	M.	20	Bifid rectum (diverticulum).	1	Middle rectum.	Fecal fistula, marked improvement in two months.

Telling has reported 11 cases of rectal diverticula, the majority of which from his description were evidently *sigmoidal sacs*.

Formerly what is now recognized as the pelvic colon, having a peritoneal covering and mesocolon, was described as the upper third of the rectum; this segment of gut, which is frequently the

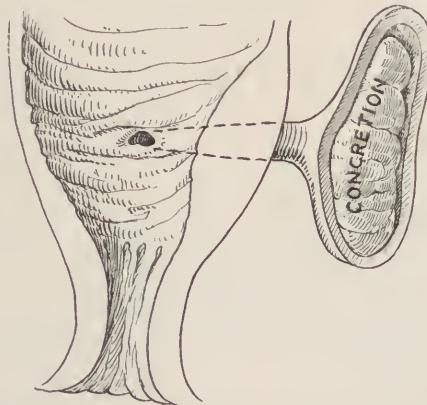


Fig. 564.—Rectal diverticulum that contained a concretion and discharged into the rectal ampulla through a small opening.

site of diverticula, is, in reality, a *continuation of the sigmoid flexure*, and sacs located here should not be diagnosed as *rectal*.

ETIOLOGY

The average age of patients suffering from rectal pouching is less than in the sigmoidal variety, probably owing to congenital



Fig. 565.—Large sac or diverticulum located between the lower rectum and coccyx filled with impacted feces. This condition might be designated bifurcated rectum. The coccyx deviates posteriorly.



Fig. 566.—Anterior rectocele distended with feces that resembled a diverticulum.

anomalies and because *sacs* are more frequently multiple in the colon and sigmoid than in the rectum.

Herniation of mucosa through museulature is rare, and reetal diverticula are usually caused by distention and pressure incident to hardened feces, or to stercoral or other ulcers through which feces or gas escape and induce sacculation of outer bowel tunies.

Appendices epiploicae are not causative factors in rectal pouchings, and vessel openings play no part in their production. Predisposing causes of anorectal diverticula are eogenital defects, absence of the coccyx, relaxed rectovaginal septum, pointed foreign bodies, ulcerated areas, abscess, fistula, and constipation with muscular atrophy and recurring eoprostasis. The author believes rectal diverticula occur more frequently than suspected.

Vesico-intestinal (Fig. 567), sigmoidal, and rectal fistula is a frequent complication of diverticulitis; in 25 of Cripp's 63 collected cases the opening communicated with the reetum, and the probabilities are that in several of these diverticulitis was responsible for the trouble.

PATHOLOGY

The *pathology* of rectal is similar to that of diverticula located in the sigmoid flexure, except *sacs* in the former place are nearly always associated with or caused by an abscess that periodically discharges into the rectum. Rupture or perforation is not so dangerous, since it occurs below the peritoneal attachment. There is more or less occlusion due to the formation of firm, inflammatory masses, but circular stenoses are rare. Diverticula may contain gas, feces, pus, or neerotic tissue, and no doubt are occasionally diagnosed and treated as ordinary abscesses.

Divertieula of the small intestine, colon, and sigmoid flexure may be multiple and frequently do not cause symptoms, but rectal diverticula are usually single, invariably undergo secondary changes, and the accompanying diverticulitis and peridiverticulitis induce distressing or dangerous manifestations that may simulate those of inflamed colonic sacs.

SYMPTOMS AND DIAGNOSIS

Characteristic *symptoms* of anorectal diverticula are sensations of burning, weight, fulness, desire to stool, and unrelieved feeling following defecation; but when an abscess has formed, irregular or high temperature, continuous pain, tender swelling, painful defecation, rectal tenesmus, vesical irritation, and manifestations of infection are complained of.

A *diagnosis* is difficult and divertieula must be differentiated

from chronic abscesses, fistula, neoplastic tuberculosis, gumma, inflammatory stricture, and carcinoma. Occasionally they are detected by digital examination or inspection of the rectum through a proctoscope, which enables one to see and probe (Fig. 567) communicating openings and note whether or not rectal mucosa is smeared with pus from the diverticulum. Preoperative diagnosis is seldom made and occasionally unsuspected sacs are discovered during postmortem examination.

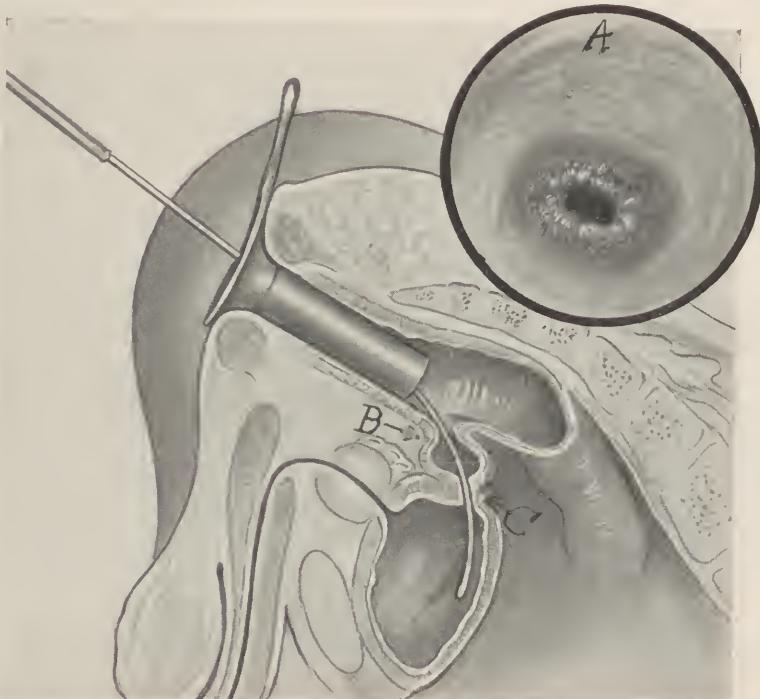


Fig. 567.—Diverticulum involving the upper rectum that caused rectovesical fistula: A, Excoriated rectal opening as viewed through a proctoscope; B, diverticulum; C, probe introduced through rectal aperture, diverticulum, and vesical opening with aid of the proctoscope and reflected light.

Radiographs are occasionally helpful in clearing up the diagnosis.

TREATMENT

Palliative measures have no place in the treatment of anorectal diverticula.

Diverticulitis at the rectosigmoidal juncture is handled like inflamed sacs involving the colon or sigmoid flexure discussed elsewhere. Rectal pouches are usually infected and best cured by cut-

ting down on them from within or without the bowel, and after the sac has been incised, excised (Fig. 568), or curedted and irrigated a drain is inserted that communicates with the surface (Fig. 569). Multiple diverticula are connected by cross incisions and drained unless situated on opposite sides of the rectum, when they are separately operated upon.

Occlusion from a circular inflammatory stricture or protuberant mass is usually troublesome, and splitting of the bowel at the obstructed point is necessary, since divulsion gives but temporary relief.

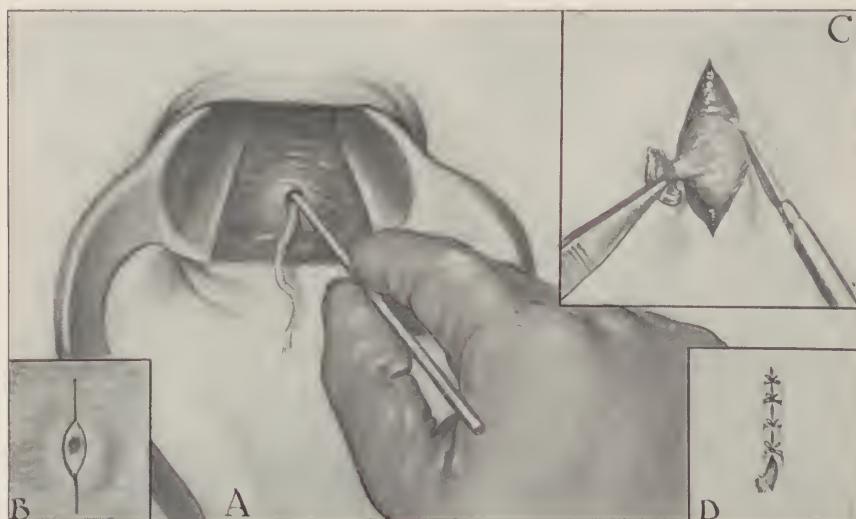


Fig. 568.—Technic of author's method of excising a rectal diverticulum: *A*, Sac being distended with packing so that it may be easily identified; *B*, lines of incision made over the tumor; *C*, diverticulum being dissected free from surrounding structures, and *D*, wound partially closed by interrupted sutures and drained with gauze.

Occasionally nothing short of *rectal extirpation* will permanently relieve the patient; when occlusion is almost complete and obstructive manifestations are acute, and excision of bowel and sac by the *vaginal-perineal*, *Kraske*, or *perineo-abdominal* route is not feasible, an *artificial anus* is established to relieve obstruction and promote drainage.

Complicating fistulæ and abscesses are incised and drained, and vesicorectal sinuses are treated in the manner elsewhere recommended for the cure of *vesicosigmoidal fistulæ* connected with diverticular sacs. Since multiple, small, and non-infected pouches so often encountered in the colon and sigmoid flexure are never discovered in the rectum, *infolding* or *excision of the sac* and suture

of the gut wound is rarely indicated in the treatment of anorectal diverticulitis.

Diverticulum of the Upper Rectum Simulating an Old Abscess Cavity.—Female, aged forty-nine, who at first complained of marked constipation, recurring fecal impaction, fulness, gradual increasing pressure in the rectum, straining, and later of constipation alternating with diarrhea; there was no loss of weight, cachexia or pus, blood or mucus in the stools, or history of previous abscess; two physicians had diagnosed her condition as cancer.



Fig. 569.—Rectal diverticulum. A piece of gauze wound around dressing rod disappearing in diverticulum. Following splitting, cureting, and irrigation of the sac the cavity and wound is lightly packed with gauze to control bleeding.

Digitally a hen's-egg-sized, smooth, firm, ovoid tumor projecting from the left posterior wall could be defined, which reached downward to the upper end of the anal canal. Pus could not be expressed from the tumor and introduction of the finger caused no pain or bleeding. With aid of the proctoscope, reflected light, and an angle probe an opening connecting the rectum with a cavity outside the bowel was detected and a diagnosis of diverticulitis made.

Treatment.—Following exposure of the rectal opening in the diverticulum with the author's operating speculum (Fig. 68), it and the mass was incised, exposing an extrarectal tumor 1 inch (2.54 cm.) in depth and 3 inches (7.62 cm.) in length; the pouch

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was curedt, irrigated, dried, treated with carbolic acid, and packed to arrest bleeding. A drainage incision was then carried from the diverticulum through the anal canal to the perianal skin and packed with gauze.

Postoperative treatment was similar to that employed following operations for chronic abscess and fistula. Dressings were continued for six weeks, when the wound healed. This patient was examined and found to be well six years later. Sectioned tissue examined showed elements of the rectal tunics and hyperplastic infiltration of the gut wall, and dried feces were found in the sac.

Chapter L

Malignant Growths of the Rectosigmoidal Juncture, Rectum, Anus, and Perianal Region

CARCINOMA, EPITHELIOMA, SARCOMA

GENERAL REMARKS, ETIOLOGY, CLASSIFICATION, PATHOLOGY

In the preceding chapter the differentiating, structural, and other characteristics of benign and transitional neoplasms were discussed from all angles, and it remains for the author here to consider truly malignant growths—*epithelioma*, *carcinoma*, and *sarcoma*.

Cancer is seldom encountered in tribal communities, but is constantly increasing in civilized countries, and is more prevalent in some than other sections. Malignancy attacks alike healthy and unhealthy individuals, the rich—most often—and poor, all races, persons leading sedentary or active lives, and is encountered in all countries, but occurs most frequently in low-lying and communities having imperfect sanitation.

A few decades ago many more persons died from tuberculosis than cancer, but at present the mortality from the former is but slightly above the latter.

Statisticians have prepared elaborate tables giving the mortality ratio between malignant and other diseases, but figures differ widely, and are useless except to show that the relative frequency of death from cancer to other diseases is growing yearly. No organ is exempt from cancer, but the malignancy shows a decided preference for the lower bowel.

To indicate the relative frequency of malignant disease in the rectum and other organs Williams' table has been incorporated, which shows that in 7327 instances of organic cancer the rectum was involved in females in 4.3 and in males in 7.5 per cent. of cases.

STATISTICS OF CANCER

Females, 4628 Cases	Per cent	Males, 2699 Cases	Per cent.
Breast.....	40.3	Tongue and mouth.....	26.3
Uterus.....	34.0	Skin.....	14.3
Rectum.....	4.3 -	Lip.....	12.2
External genitalia.....	3.4	Rectum.....	7.5
Skin.....	4.1	Stomach.....	8.3
Stomach.....	2.8	External genitalia.....	6.8
Liver.....	2.5	Esophagus.....	5.3
Tongue and mouth.....	2.18	Liver.....	4.4
Intestines.....	1.06 -	Intestines.....	1.9 -
Esophagus.....	0.70	Breast.....	0.6
Lips.....	0.06	Prostate.....	0.3
All other localities.....	4.60	All other localities.....	12.1
	100		100

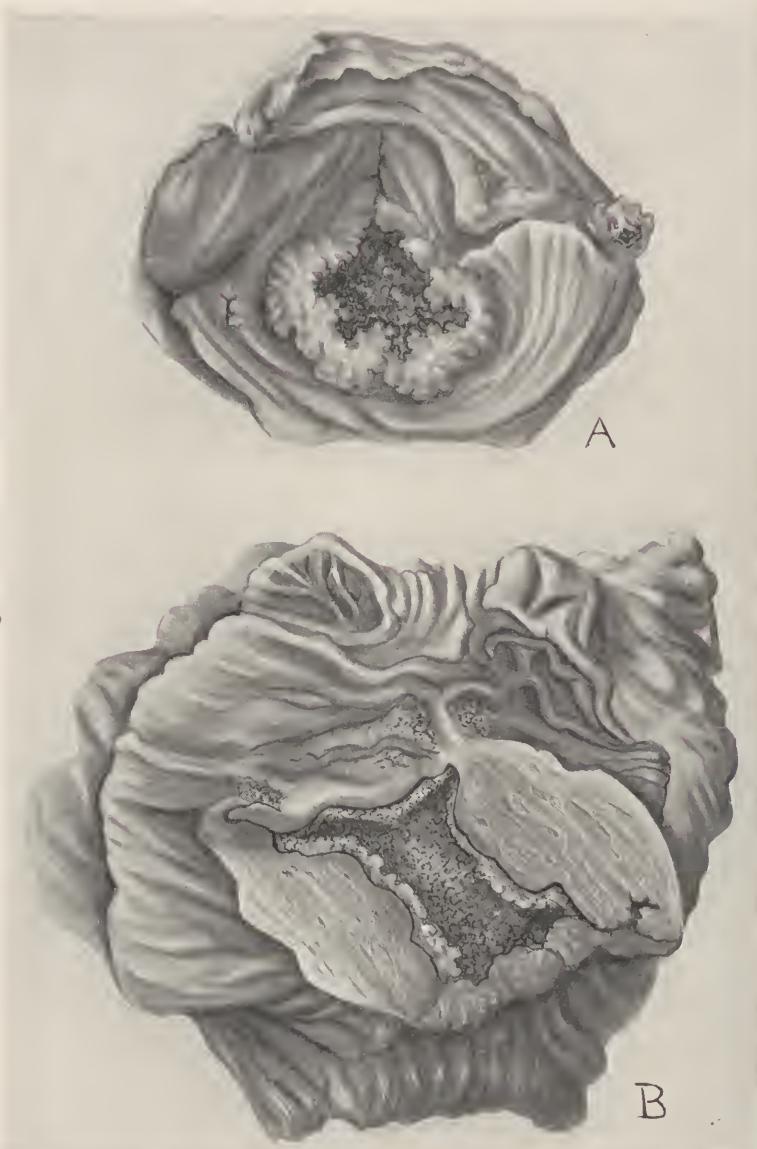


Fig. 570.—Annular carcinoma (A) at the rectosigmoidal juncture successfully excised by abdominoperineal proctectomy. B, Scirrhous carcinoma with extensive ulceration that occupied the rectal ampulla removed by vaginal proctectomy.

In another series of cases—9228—all organs, 534 involved the intestine, of which 408 were located in the rectum, 27 involved the anus, and 99 were situated in the small intestine, colon, and sigmoid flexure.

Leichtenstern's statistics indicate that of intestinal cancers 80 per cent. are rectal; 11.5 cecal, colonic, or sigmoidal; 4.2 appendical, and 4.3 per cent. are small intestinal growths.

Allingham analyzed 4000 cases to ascertain the ratio between anorectal cancer and *other diseases* in this region, and found that 2.6 per cent. of the cases were malignant, but the author believes rectal malignancy occurs more frequently than this percentage indicates.

Of 300 anorectal cancers examined by the author to determine the relative frequency with which the disease attacked different segments of the rectum, neoplasms were located in the ampulla in 50; upper rectum, 20; rectosigmoidal juncture, 15; anal canal, 10, and at the anus in 5 per cent. of cases (Fig. 571).

A careful analysis of the author's cases indicates that approximately 80 per cent. of malignant tumors involving the small and large intestine are located in the rectum.

ETIOLOGY

In spite of brains, time, and money expended by medical men throughout the world in endeavoring to determine the etiology of malignant disease, its true cause yet remains to be discovered.

Cohnheim held that cell proliferation in cancer is not the result of mature pre-existing normal tissue, but develops from the matrix of arrested embryonic cells which later take on lawless proliferation.

The parasitic theory is attractive because of unique characteristics and resemblance to the action of other parasitic infections upon general health, but some prominent authorities strongly maintain that parasites have nothing to do with cancer production, though Gaylord claims to have produced adenocarcinoma by inoculation in animals.

While we do not know the true etiologic factor, several predisposing causes of cancer have been accepted, the most important of which are: *irritation, trauma, habits, hereditary tendency, age, sex, occupation, locality, race, and diet.*

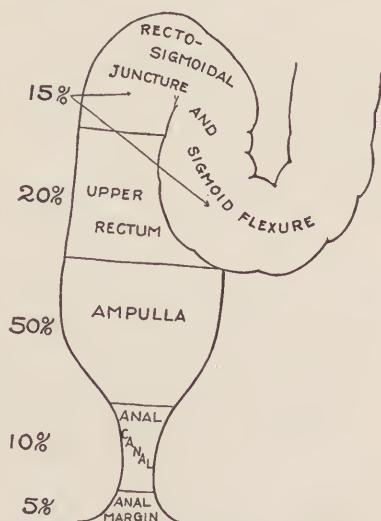


Fig. 571.—Most frequent sites at which rectosigmoidal cancer was encountered in 300 cases examined and tabulated by the author.

Irritation and Trauma.—Continued irritation and trauma are, in the author's opinion, most significant predisposing causes of cancer in the rectum and elsewhere, examples of which are: epithelioma of the lip in pipe smokers, scrotum in chimney sweeps, hands in *x-ray* specialists, paraffin and wax workers, and carcinoma of the breast, rectum, and cervix; the rectum being frequently bruised during defecation, and cervix lacerated during labor.

Malignant changes seldom result from a single, but often follow continuous or repeated insult to a definite structure, evidence of which is found in the fact that intestinal cancer nearly always occurs at the anus, sigmoid, hepatic or splenic flexure—segments of gut most often traumatized by passage of the feces or expulsion of impacted scybala or foreign bodies. Repeated trauma leads to congestion and breaking the epithelial covering of the involved part, which opens an ideal foal point for entrance of parasites, bacteria, toxins, or the irritant responsible for malignant disease.

It is not known if cell proliferation and infiltration result directly from trauma, or whether irritation is responsible for local changes—nutritional, circulatory, or toxic—that prepare the field for an active, causative, *cancerous agent*, for which, according to Cohnheim, an embryonic tissue matrix must be present.

Benign tumors of the rectum are potentially dangerous and are in the majority of instances transformed into malignant growths in a few months or years, particularly adenomata.

The following are some of the diseases and conditions known to belong to the so-called *precancerous* state: *benign neoplasms*, inflammatory or ulcerative catarrhal or infectious *coloproctitis*, *constipation* complicated by fecal impaction, *hemorrhoids*, *fissure*, *chancroids*, *secondary luetic* and *tubercular* lesions, continued irritation incident to *catharsis*, *localized medication*, *introduction of enema tubes*, *x-ray burns*, and *scar tissue* however produced.

Malignancy often develops at the site of gastric, duodenal, and rectal ulcers, the cervix, and vicinity of fistula, wounds, and points dominated by cicatricial tissue, probably owing to the fact that scar tissue poorly nourished harbors bacteria, factors interfering with the mesodermal elements. Continued irritation from the *x-ray*, heat, chemicals, and irritating gases are undoubtedly forerunners of cancer.

Heredity Tendency.—Ancient physicians placed more importance on heredity as an etiologic factor in cancer than modern, and the laity still believes the disease is usually traceable to this source.

Malignant disease has occasionally been observed in consecutive generations of a particular family, sometimes attacking the same organs in children, parents, and grandparents. Napoleon Bonaparte I, his father, brother, and 2 sisters died of gastric cancer. Broca relates an interesting case of Madame Z., who died of a malignant breast, leaving 4 daughters, A., B., C., and D., who died of mammary or hepatic cancer.

Madame A. was survived by 3 daughters, who lived to an advanced age; Madame B. left 5 daughters and 2 sons; one escaped, but the other son died of gastric malignancy, while the 5 sisters succumbed to cancer of the breast or liver; Madame C. also had 5 daughters and 2 sons, of whom the sons were free, but the girls died of malignant disease in the breast, liver, or uterus; Madame D.'s child, a son, was not afflicted with cancer; Madame C.'s oldest daughter was survived by 2 sons and 3 daughters, one of the latter dying from mammary cancer.

The author has personally known of several instances where families for two or three *different* generations were afflicted with cancer, and from his experience, study of literature, and increasing frequency with which children and young adults are attacked by cancer, inclines to the belief that in rare instances certain individuals possess an *hereditary tendency* to malignant disease, or, as in tubercular families, might contract the disease from close association with the already afflicted.

This affection is a disease *per se* of middle and later life, and this might argue against a hereditary theory of cancer, because it would seem if the tendency were there, persons having it would develop malignancy earlier in life.

When cancer is observed in families for several generations the author believes the presence of cancer is *coincident*, and not the result of an *hereditary* tendency except in rare instances.

Age appears to be in some way connected with the etiology of cancer, for malignancy occurs very frequently between the ages of forty and fifty, is most common in elderly persons, occasionally encountered between twenty-five and forty, and in rare instances is met with in infants, children, and young adults. One infant suffering from atresia ani is reported to have been afflicted with cancer at birth.

Cancer in the young progresses much more rapidly than in the aged, probably owing to the fact that their vitality and circulation is more vigorous than that of the latter.

The accompanying table, including the collected cases of Finet, Quénau and Hartmann, and Tuttle, together with the author's

personal cases, gives a fair idea of the frequency with which *rectal cancer* is encountered during the various stages of life:

	Finet's collection.	Quénu and Hartmann's personal cases.	Tuttle's collection.	Author's personal cases.
Under 20.....	..	..	7	10
From 20 to 25.....	25	3	6	9
From 25 to 30.....			7	12
From 30 to 35.....	18	0	25	29
From 35 to 40.....	38	3	26	28
From 40 to 45.....	35	5	25	34
From 45 to 50.....	51	8	27	42
From 50 to 55.....	47	8	29	39
From 55 to 60.....	55	4	30	36
From 60 to 65.....	27	5	24	32
From 65 to 70.....	20	..	6	19
From 70 to 80.....	5	4	2	10
Number of cases.....	321	40	214	300

The author treated 3 lads sixteen, seventeen, and twenty, and 6 girls fifteen, seventeen, eighteen (2), nineteen, and twenty years of age for carcinoma, and a youngster eleven years old for sarcoma in the anorectal region. From his experience and a study of recent statistics he believes cancer is more common in persons under twenty years than the profession realizes.

Sex.—If cancers in all parts of the body are included they are met with more frequently in women than men, but in the rectum the reverse is true, and in the author's personal cases the ratio is 52 for males and 48 per cent. for females.

The author has several times encountered anorectal malignancy in both women and men under thirty years of age.

Occupation.—Persons following a *sedentary* occupation suffer from cancer more often than outdoor workers, and individuals constantly subjected to heat or whose hands, legs, or bodies are exposed to irritation or bruising are frequent sufferers from malignancy. Many *x-ray* specialists develop cancer on the hand, and the disease is frequently encountered upon the lip of pipe smokers and the scrotum of chimney-sweeps, etc.

Locality.—Malignant tumors are more common in low-lying, unhealthy than in elevated, well-drained communities, and there are said to be *cancer houses* that predispose inmates to the disease, but the occurrence of malignancy in them is more likely coincidental.

Race.—Cancer is less common among Indians and Africans than individuals living in civilized countries, probably due to

their simple life, healthy diet, and small population. Malignant tumors of the rectum are almost unknown among American *negroes*, and the author has never heard of or treated a case of rectal cancer in a colored individual, though he has maintained several negro clinics.

Many colored persons suffer from tuberculosis, syphilis, or both, which possibly renders them *partially immune* to malignant disease in the anorectal region.

Diet.—Some authorities hold pork, fish, macaroni, and bread freshly eaten are predisposing factors in cancer, because they are fattening, and obesity subjects are frequent sufferers from malignancy.

CLASSIFICATION

Clinically speaking, there are many varieties of cancer, but classified according to their structure there are but two general types, namely, *carcinoma* and *sarcoma*.

Carcinoma is common and *sarcoma* rare; of Williams' 435 cases of anorectal cancers, there were 428 carcinomata and 7 sarcomata. In the author's opinion approximately $\frac{1}{2}$ per cent. of malignant growths occurring in the anorectal region are sarcomatous. Sarcoma is met with proportionally more frequently in children and young adults than carcinoma.

Carcinoma (*καρκίνος*, a crab; *όυα*, tumor) or true cancer is an organoid neoplasm of uncertain origin, characterized by a vascular connective-tissue stroma forming alveoli, containing proliferating epithelial cells, variable in size and shape, having a tendency to destroy adjacent tissue, produce metastasis, and recur following extirpation.

There are two distinct types of true—*epithelial*—cancer: (1) Squamous—flat pavement—celled epithelioma; (2) cylindric—columnar—celled carcinoma.

Epithelioma originates at the anus, is rare, not so malignant, grows slowly, and causes metastasis late; while *cylindric-celled carcinoma* originates in the rectum, spreads rapidly, is complicated early by metastasis, and recurs following extirpation more frequently than squamous-celled cancer.

To avoid confusion the author will apply the term *epithelioma* to *pavement-celled* or *anal—skin*—and *carcinoma* or *adenocarcinoma* to *cylindric-celled* or *rectal* cancer.

In 300 of the author's consecutive anorectal cancer patients tumors were encountered in the rectum and sigmoid flexure in 95, and at the anus in 5 per cent. of the cases (Fig. 571).

PATHOLOGY

Epithelioma seldom originates in the rectum and *carcinoma* rarely starts at the anus or on the perianal skin, but the former is said to have originated in the bowel after *cylindric* had been converted into *pavement epithelium* by syphilitic or other inflammatory processes.

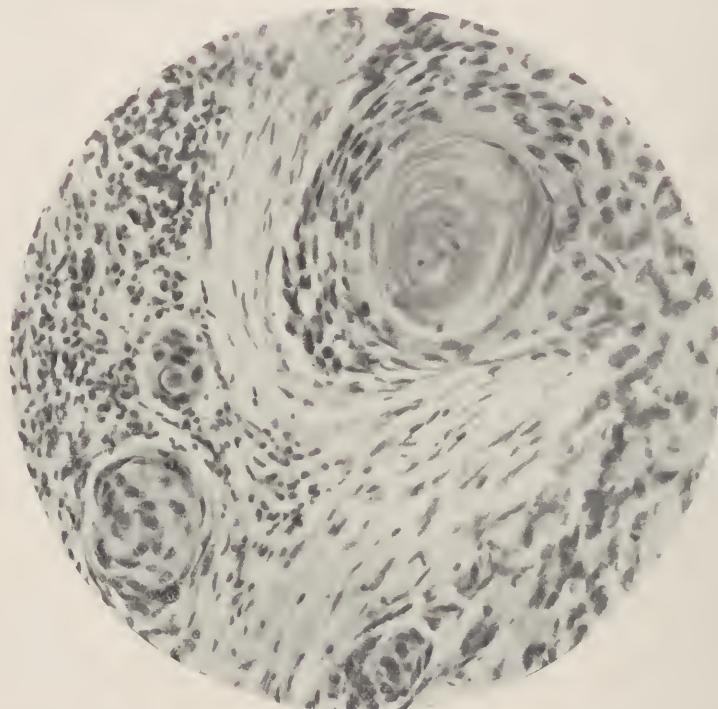


Fig. 572.—Microphotograph of anorectal epithelioma ($\times 250$). Above is a cell nest or epithelial pearl composed of horny material the product of the surrounding layers of epithelial cells representing the rete malpighii of the epidermis. On the right of the pearl can be seen some traces of the stratum granulosum between the horny material and the epithelial cells. Outside of the epithelial layers is a stroma of fibers and spindle-shaped cells, indicating the white fibrous tissue of which it is composed. To the left are two small epithelial pearls in an earlier stage enveloped by an area of round-cell infiltration called into existence by the irritation caused by the advancing growth.

Epithelioma.—Flat pavement- or squamous-celled *epithelioma* (Fig. 572) originates in the perianal skin (Fig. 574) at the mucocutaneous border or lower $\frac{1}{2}$ inch (12.70 mm.) of the rectum, where the anal lining membrane is peculiarly constructed owing to blending of skin and mucous membrane.

Epithelioma attacks the mucosa of the rectum proper only in cases where *cylindric* has been changed into *pavement epithelium* by catarrhal or specific inflammatory processes, and carcinoma or

glandular cancer rarely attacks the perianal skin and then only by direct extension.

The *macroscopic* and *microscopic* (Fig. 572) appearance of anal does not differ materially from epithelioma elsewhere. Cancer here usually progresses slowly and causes little suffering for several weeks or months, but in rare instances growth is rapid, the cancer induces terrific pain, and early exhibits malignant characteristics.

Epithelioma originates in the superficial epithelium, the sudoriferous or sebaceous glands, at the site of a fissure, ulcer, abrasion, cicatrix, mole, or psoriatic patch at or near the anal



Fig. 573.—Virulent epithelioma that destroyed the lower rectum and superficial and deeper structures of the perianal region.

margin. The neoplasm usually begins as a firm papillary excrescence, but in rare instances starts as an ulcer. Later the growth appears as a hard, dry, wart-like nodule having an infiltrated base showing but a slight tendency to ulcerate. When fairly developed the tumor breaks down to form an indolent sensitive ulcer, having a raised, reddish, fluted or irregular indurated border (Fig. 573) and a grayish base.

Epitheliomata may remain *superficial* or become *deep seated*, the former being less malignant since lymphatics are not extensively involved, and in both types metastatic deposits are *late* and show characteristics of the *parent tissue*.

Skin cancers occasionally remain localized, but may spread to the perineum, scrotum, labia, and vagina (Fig. 573), destroying the integument, leaving an angry-looking, irregular or fissured raw surface, dotted here and there with cauliflower-like excrescences; the lesion shows little tendency to permanently improve under treatment, but at times may heal on one side, forming glistening scars, while cell proliferation and ulceration extend in another direction.

Frequently epitheliomata exhibit a tendency to scab over, followed by a falling away of the crust and exposure of an ulcer that increases in size and gives off a free irritating discharge that burns the skin. These growths are movable in the beginning,



Fig. 574.—Epithelioma extensively involving perianal skin, gluteal muscles, sphincter, and mucosa of the anal margin.

but become fixed as they involve deeper structures, surround the anus, and attack the perineum or urethra.

This form of cancer, even in neglected cases, rarely attacks the rectum (Fig. 573) unless complicated by mixed infection, but may dissect the bowel free from without and do enormous damage to superficial and deep structures of the perianal, rectal, and perineal regions.

Epitheliomatous ulcers have a violaceous hue, are extremely sensitive, bleed slightly or profusely, possess a vermicular or nodulated border, cause partial or complete incontinence when the sphincter is involved, and abscess and fistula are occasional complications.

Cancer beginning at the anus is less malignant than rectal-glandular—carcinoma, evidence of which is seen in its slow growth, trivial loss in weight, slight tendency toward metastasis, less marked cachexia, and occasional cure accomplished by radium, *x*-ray, arsenic and zinc paste, or extirpation.

Epithelioma is characterized by nests of pavement epithelium arranged in concentric rings forming so-called *epithelial pearls* (Fig. 572), or round, hard masses occasionally designated *horny cancer*. Cells are retained by connective-tissue stroma, and, in addition, the cancer contains blood-vessels and round or inflammatory cells.

Epitheliomata are easily excised in their incipiency, but a radical cure is hopeless when they extensively involve superficial



Fig. 575.—Epithelioma that originated at the anal margin as an ulcer and which extended in both directions, destroying skin, sphincter, and lower rectum.

and deeper structures surrounding the anus because of injury to vital organs caused by operation and the enormous wound left when edges of the incision cannot be approximated.

Carcinoma.—Because of its frequency, resulting intense suffering, and malignancy carcinoma is the most serious affection with which proctologists have to contend.

In its incipiency *cylindric-celled* or glandular *carcinoma* structurally resembles *adenoma* (Fig. 520), since it is accompanied by gland- and tube-like formations that histologically mimic normal epithelial glandular structures of the mucosa. Owing to this and the frequency with which benign adenoma undergoes transition into carcinoma, columnar cell cancers are often designated *adenocarcinomata* (Figs. 577, 578).

Adenocarcinomata may be of slow growth, vary in size, shape, and consistence, and be located anywhere, but most frequently are found on the *anterior* or *posterior* rectal wall above the anal canal, though in exceptional instances may be situated laterally, encircle the gut, or encroach upon the anus.

In a fully developed neoplasm cells proliferate rapidly and lawlessly, are larger than normal, have single or multiple nuclei with mitotic figures, are arranged in one or more layers; the glands



Fig. 576.—Adenocarcinomatous tubular stricture of the lower rectum excised by the author.

are dilated and irregular in shape and proliferate lawlessly, membra propria gives way, and branching tubules lined with simple or atypic epithelia extend to the submucosa, museulature, or serosa, converting the involved segment of bowel into neoplastic tissue.

There is a reactive formation of fibrous tissue about glandular structure which, according to the amount of connective tissue deposited, determines the firmness and *degree of malignancy* of the neoplasm, hard being less malignant than soft cancers.

Development is slow when stroma preponderates, rapid and in-

volves adjacent structures when glandular *epithelial* elements predominate. New growths having tubules lined with a single layer of columnar epithelium with lumina open, resemble *benign* or *adenoma* in transitional stage, but when, as result of proliferation, tubules are distorted and their lumina are obliterated by atypical cells,



Fig. 577.—Mucous surface of annular adenocarcinoma of the upper rectum extirpated by the author.



Fig. 578.—External appearance of adenocarcinomatous rectum removed by combined operation.

the neoplasm is a typical adenocarcinoma, sometimes designated *malignant adenoma*, *adenoma destruens*, or *adenoid cancer*.

Originating in superficial epithelium or glands of Lieberkühn the growth extends by cell proliferation (Fig. 579) to form a diminutive movable swelling that soon becomes fixed and indurated as infiltration progresses and reactionary fibrous tissue forms.

Adenoid is the most common type of cancer and the growth is usually soft or gelatinous in consistence, and appears as elevated or lobular masses which when compressed exude so-called cancer juice that produces a milk-white solution when mixed with water.

Carcinomata may extend by direct involvement of adjacent structures, enter the lymphatic channels or be transported to the nearest lymph-nodes, to near or remote organs, and produce malignant foci mimicking the *parent tumor*.



Fig. 579.—Adenocarcinoma of rectum ($\times 250$). A portion, highly magnified, taken from the inner muscular coat. In the center is an alveolus with patent lumen lined with columnar epithelium. The central alveolus and the three smaller ones surrounding it are embedded in a layer of white fibrous tissue, the wavy bundles of which can be easily traced, while beyond the fibrous tissue, best seen on the right of the photograph, are the elongated smooth muscle-fibers of the muscular coat.

Malignant infection from *rectal* carcinoma involves the *retroperitoneal*, *sacral*, and *lumbar nodes*; while anal or *squamous-celled* cancer—*epithelioma*—early attacks lymphatic glands of the *inguinal* region (Fig. 597).

The mucosa becomes ulcerated early from irritation and tissue necrosis, or honey-combed by the destructive process, while the neoplastic mass is extending in other directions. Gradually a

round flat swelling with an elevated center forms which includes the mucosa, submucosa, and muscularis, if not the peritoneum. Eventually the growth may encircle the bowel, convert it into a narrow tube or project into the gut lumen, under which circumstances it is designated *annular*, *tubular*, or *protuberant* (Fig. 580) cancer.

Carcinoma in the *upper rectum*, *sigmoid flexure*, and *colon* tends to follow lymph- and blood-vessels forming narrow, encircling, contracting neoplastic bands—*annular* (Fig. 570, A), *scirrhous structure*—but in the middle and lower rectum tumors are usually lobulated and inclined to take a vertical direction.

Extensive *non-malignant strictures* are quite common, but *tubular* (Fig. 576)—fibrous or *scirrhous*—rectal cancers have rarely been encountered by the author. Malignant neoplasms may remain single or blend, forming an enormous mass that extensively involves the bowel and adjacent structures.

Superficial or deep *ulcers* may be an early or late complication of rectal malignancy, and be single or disseminated over the growth. Typical ulcers are *punched-out* or *crater-like* and result from necrosis of the central tumor mass, which not infrequently leaves a deep *cavernous* hole in the new growth that to the touch feels like a hard, eroded cervix. The ulcerated areas are *shallow* in annular and tubular, and *deep* in protuberant, cancer (Fig. 580).

Non-malignant stercoral ulcers and dilation of the bowel *above* the growth are due to constant gas and fecal accumulations and interference with circulation. The secretion from stercoral ulcers is disagreeable, while the discharge from cancerous craters is particularly irritating, offensive, and because of its peculiar odor is considered an important diagnostic indication of rectal cancer.

Hemorrhage from malignant encroachment may be slight or profuse, depending on the size and number of vessels eroded.

Protuberant tumors partially or completely occlude the bowel, but annular and tubular constricting growths produce a higher degree of obstruction. While the mucosa is usually ulcerated, in exceptional instances it may remain congested and unbroken, or be dotted over with hypertrophic vegetations that are benign or malignant, depending on precancerous processes in the bowel. Such *excrencences* and larger cauliflower-like polyps if not already malignant rapidly become so and blend with the central new growth.

Soft medullary or *encephaloid* cancer develops rapidly, while *scirrhous* grows slowly; but in either case the tumor assumes con-

siderable proportions in from three to six months, and is usually inoperable shortly thereafter. *Metastasis* appears in the glands early, replacing the precancerous adenitis, and sooner or later attacks the liver, lung, peritoneum, mesentery, omentum, prostate or sacrum, and less often axillary and supraclavicular lymph-nodes—the latter being an early manifestation of gastric cancer—and the degree of metastasis is not necessarily proportionate to the size of the tumor.

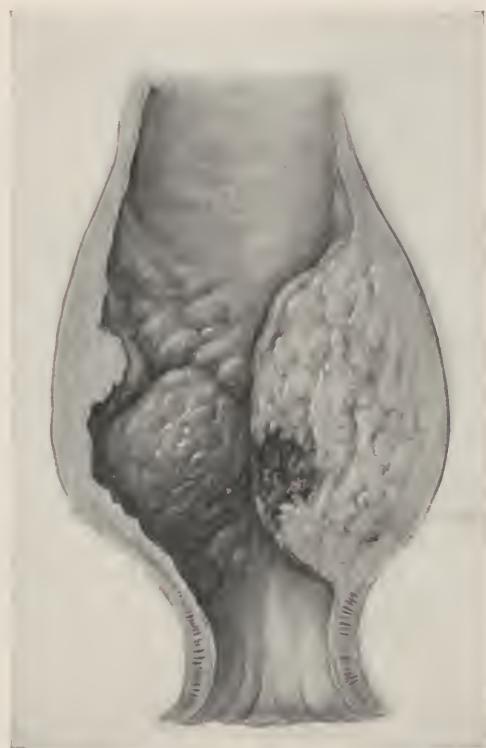


Fig. 580.—Cylindric-eelled carcinoma; note *protuberant* form of tumors and deep crater-like ulcer in cancerous mass to the right.

Anorectal cancers are sometimes designated as: (a) *medullary*—soft, encephaloid; (b) *scirrhous*—hard; (c) *colloid*, and (d) *melanotic*—black—depending on the degree of degeneration or predominance of glandular elements—*stroma* or *pigment*.

While the macroscopic and microscopic appearance of these neoplasms and malignant adenomata are characteristic, they are regarded by the author as varying types of carcinoma—cylindric, columnar celled—because of their glandular elements.

Medullary—Encephaloid—Carcinoma.—Soft or medullary cancer is composed of an abundance of epithelial cells and slight amount of stroma, contains few blood-vessels, is pale in color and slightly resembles brain substance, on account of which it is often designated *encephaloid* cancer.

Medullary is quite common, very malignant, of rapid growth, attains enormous proportions, is early complicated by metastasis, and often recurs following extirpation.

Occasionally encephaloid growths are very vascular, when they are called *carcinoma teleangiectodes*. Soft cancers are of a spongy consistence, and when cut or squeezed exude a juice mainly composed of degenerated cell nests that turns water white—*cancer milk*.

Medullary carcinoma is encountered more frequently and earlier in life than scirrhous, shows a decided tendency to attack neighboring organs and the perirectal, sacral, and retroperitoneal lymph-nodes, but metastases are not as frequent in remote organs as in adenoid cancer, because the patient succumbs to the disease before this takes place. Sometimes these tumors look like placenta and bleed freely when traumatized by the examining finger or proctoscope, but in other instances they appear as nodular or ulcerated masses encompassed by fibrous tissue.

Encephaloid neoplasms may undergo central fatty degeneration, in which case large alveoli are distended with a glue-like translucent yellow substance, and the tumor fluctuates; or masses may undergo superficial ulceration, which is complicated by breaking off of tissue, slight or profuse bleeding, and a gelatinous, acrid, mucopurulent discharge admixed with so-called cancer milk.

Scirrhous Carcinoma—Hard—Fibrous Cancer.—Fibrocarcinoma—*hard*—is common in the *upper* rectum, and *soft* cancer in the *lower*. Scirrhous cancers originate in the submucosa, often on the anterior wall above the prostate, and are prone to encircle the bowel, forming *annular* or *tubular* stricture. These neoplasms are not very common or very malignant owing to the *preponderance* of connective tissue and few epithelial cells composing them (Fig. 581).

Scirrhous cancers may originate as such, but in rare instances start as soft neoplasms and become dense, contracting proportionately as stroma increases and cells perish. Hard cancers may remain firm or undergo hyaline, mucoid, colloid, or fatty degeneration, being converted into soft, medullary, or colloid tumors; but in the majority of instances a liberal stroma surrounds small alveoli containing atrophied, distorted, or degenerated epithelial cells. When incised, tumor masses are bluish-white in color, cartilaginous

to touch, produce a creaking noise when compressed, and exposed blood-vessels are more abundant near the periphery than central portion of the growths.

Metastasis and *cachexia* occur later, and are less marked in scirrhous than in medullary cancer, the former being less malignant in every respect. In rare instances *melanosis* and *calcareous* degeneration have been observed in connection with scirrhous cancer.



Fig. 581.—Scirrhous—hard—cancer involving entire rectum, excised by the author. Patient well three years following operation.

Colloid Carcinoma—Alveolar, Mucoid—Gelatinoid Cancer.—All varieties of carcinomata are subject to degenerative changes in cells and stroma that may convert them into colloid or gelatinous cancers. Malignant growths of this type are often confused with medullary tumors and it is difficult to determine where one stops and the other begins.

Colloid carcinomata (Fig. 582) are composed chiefly of large alveoli distended with jelly-like mucoid material and broken-down cells. Such tumors may be large or small, are usually soft, may

remain stationary or grow rapidly, show but a slight tendency to ulcerate, or involve neighboring or remote lymph-nodes, and do not occur as often as other types of carcinoma.

As degeneration progresses gelatinoid material collects, distends and ruptures walls of the small cavities, forming larger or macroscopic alveoli, on account of which colloid are sometimes

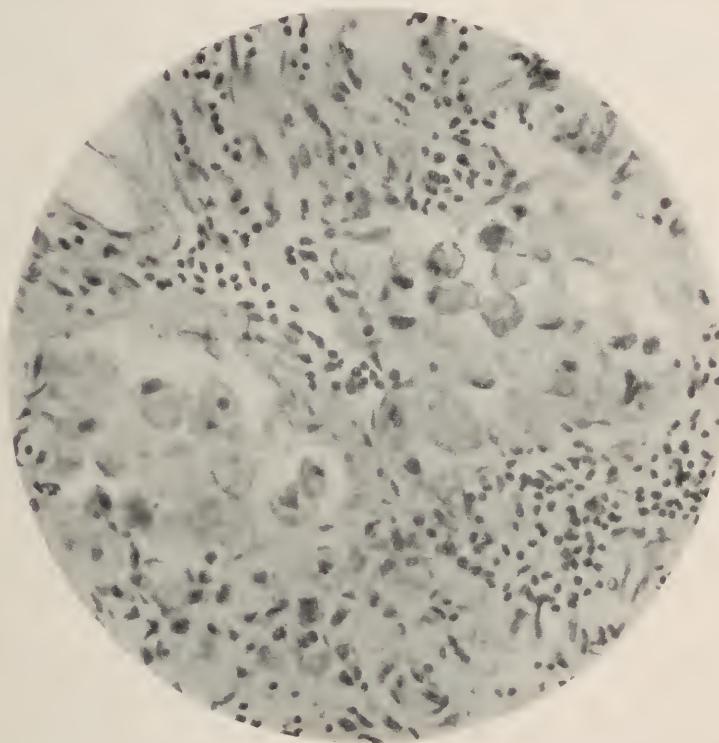


Fig. 582.—Colloid carcinoma of lymph-node ($\times 250$). Metastasis in lymph-node from carcinoma of rectum. The small black spots are the nuclei of the lymph-cells representing the original tissue of the node. The protoplasm of the infiltrating carcinoma cells is pale and swollen, containing much colloid material, the nuclei being relatively small, and in many instances displaced toward the periphery of the cell. In some cells the nucleus has entirely disappeared.

designated *alveolar* cancer. In such growths the gelatinoid content is found between the cells, in the center of cell-nests, and between stroma and cells in the form of droplets that accumulate and form larger collections. It is not known whether the transparent jelly-like material is elaborated by beaker cells, exuded by blood-vessels, or formed from degenerated stroma or cells.

The author believes colloid cancer is more common than sus-

pected, since he has operated *thirty* times for this condition. Patients afflicted with colloid carcinoma are constantly annoyed by *jelly-like* material that involuntarily escapes to soil clothing and irritate the skin; the amount of colloid material evacuated daily may vary from a tablespoonful to $\frac{1}{2}$ pint (250 c.c.).

Melanotic Carcinoma—Black Cancer.—This variety of carcinoma is quite rare and difficult to distinguish from *pigmented sarcoma*. Melanotic growths are *blackish* in color owing to the deposit of granules of *dark or brown pigment* in cells and stroma. Neoplasms of this type are moderately vascular, soft, very malig-



Fig. 583.—Enormous sarcoma involving the sacrum, pelvis, and rectum. Drawn after author's case.

nant, degenerate early, forming ulcers that bleed freely and secrete an offensive dark colored discharge.

Melanotic tumors, often encountered in horses, are more rare in man. The author has operated *six* times for carcinomatous *black cancer*.

Melanotic cancer is more common in men than women, grows rapidly, early forms metastasis in lymph-glands and other organs, and a cure rarely follows removal.

Ossifying Carcinoma.—Wagstaff, under the caption of ossifying carcinoma, describes a nodular tumor which when incised contained several sharp-pointed pieces of *bone*. The growth was in

no way connected with the coccyx, sacrum, or pelvic bones. In the author's opinion this tumor originated as a dermoid and afterward underwent carcinomatous degeneration.

Sarcoma (Gr. σάρξ, σαρκός flesh + -ωμα tumor).—This type of cancer is a highly vascular, malignant neoplasm originating in connective tissue, characterized by excessive development of embryonic cells varying in size and shape, separated by intercellular substance of a homogeneous, granular, or fibrillary character.

Sarcomata are exceedingly rare in the anorectal region and seldom discovered until inoperable; they are frequently confused with *neoplastic tuberculosis*, *gumma*, and *glandular* cancer. The author has encountered one of these neoplasms for every 200 carcinomata.

Sarcomata may be single or multiple, light, dark reddish or blackish-pigmented—in color, small or large—walnut to orange size—hard or soft, smooth or nodulated, circumscribed or diffuse, located in the rectum, at the anus or perirectal spaces, and be encountered at any age, though they are met with in childhood and active periods of life proportionately more often than carcinomata. These growths may be located in any part of the small or large intestine, but are met with more often in the ileum and rectum than elsewhere.

The accompanying tables, giving Boas' analysis of Kruger's statistics, convey a very good idea as to the decades of life in which these growths most frequently occur, and most common location of intestinal sarcoma:

FREQUENCY OF INTESTINAL SARCOMA IN DIFFERENT DECADES

Cases in the first decade.....	3
Cases in the second decade.....	3
Cases in the third decade.....	6
Cases in the fourth decade.....	10-
Cases in the fifth decade.....	5
Cases in the sixth decade.....	6
Cases in the seventh decade.....	4
	—
	37

LOCATION OF INTESTINAL SARCOMA IN 37 CASES

Small intestine.....	16
Ileum and cecum.....	1
Cecum.....	1
Vermiform appendix.....	1
Transverse colon.....	1
Small and large intestine.....	1
Rectum.....	16
	—

The author has observed sarcoma of the large intestine and rectum 14 times, viz.:

Colon	1
Sigmoid flexure	1
Rectum	4
Perianal region	8
	—
	14

The number of these cases occurring in the different decades of life were as follows:

60 to 70	1
50 to 60	2
40 to 50	3
30 to 40	4
20 to 30	2
10 to 20	1
Below 10	1
	—
	14

In the author's cases sarcoma usually originated at the anus or lower rectum, from whence they progressively encroached on neighboring structures causing unbearable pain. Neoplasms of this type grow more rapidly and earlier attack via lymphatics and blood-vessels the inguinal, rectal, sacral, and mesenteric glands (Fig. 597) than similar tumors elsewhere, and in this region sarcoma may be primary or secondary to disease in neighboring organs, and be firm and ovoid (Fig. 583), or appear as pedunculated growths.

The classification and description of sarcoma are clearly and concisely given by Langerhans¹ as follows: "According to the nature of the matrix—*i. e.*, the species of tissue—from which the sarcoma proceeds are distinguished: *fibro-* (Fig. 584), *myxo-*, *glio-*, *melano-*, *chondro-*, and *osteosarcomata*; according to the consistence, which is principally dependent upon the richness and character of the intercellular substance, the *soft* and the *hard*; according to the size of the cells, the *small-celled* and the *large-celled* sarcoma.

"*Sarcoma medullare* consists principally of cells, and contains only a small amount of intercellular substance. The cells in all sarcomata are derived from the connective tissue, but frequently reach a higher state of development. According to the shape are distinguished: *round-celled sarcoma*—*sarcoma globocellulare*—*spindle-celled sarcoma*—*sarcoma fusocellulare*—*reticular-celled sarcoma*—*sar-*

¹ Brooks, Translation of Langerhans' Essentials of Pathologic Histology, F. A. Davis Company, Philadelphia, Pa.



Fig. 584.—Extensive fibrosarcoma involving buttocks, thigh, anus, and rectum, causing obstruction, relieved by inguinal colostomy.

coma reticulare. *Sarcoma gigantocellulare*—giant-celled or *myelo-sarcoma*—is distinguished by the occurrence of numerous multinuclear giant-cells.



Fig. 585.—Double procidentia following colostomy for inoperable sarcoma involving the rectum and right hip where excessive slack had not been taken out of the sigmoid.

"In all sarcomata the cells are separated by more or less—frequently very little, scarcely recognizable—intercellular substance (Fig. 586). In consequence of this it occasionally happens that giant-cells in a tumor possess a certain similarity to cancer alveoli. There are also true mixed forms—*carcinoma sarcomatodes*—in which certain areas have a purely sarcomatous and others a carcinomatous structure.

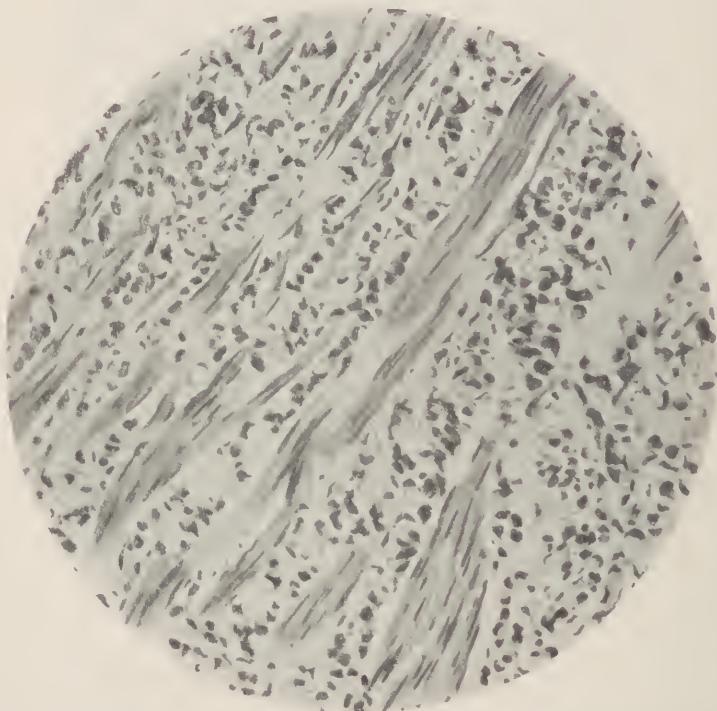


Fig. 586.—Sarcoma of the rectum ($\times 250$). The photograph shows the inner muscular coat of the rectum infiltrated by round sarcoma cells, with intensely hyperchromatic nuclei and relatively small amount of protoplasm. The fusiform cells with elongated nuclei are the involuntary muscle-fibers, somewhat compressed and atrophied on account of the infiltration.

"The intercellular substance of sarcomata is seldom pure connective, glue-yielding tissue; it often contains albuminous and mucinous constituents, so that glandular precipitations originate; it may be homogeneous—in myxosarcoma—granular—in gliosarcoma—or fibrillar.

"Sarcomata with a highly vascular structure—*sarcoma telangiectodes*—manifest a decided tendency to hemorrhages—*sarcoma haemorrhagicum*. *Sarcoma diffusum* penetrates quite equally an organ or a part of an organ in the form of an infiltration, while

sarcoma tuberosum is the common tumor form. *Sarcoma fungosum* spreads over the surface in the form of a fungus, with projecting margins; *sarcoma polyposum* resembles in its exterior conformation an ordinary polyp."

Almost any type of sarcomata may be encountered in the anorectal region—the soft or hard, small or large, round-celled, small or large spindle-celled, medullary, melanotic, cysto- and lymphosarcomata. In most instances sarcomatous growths here

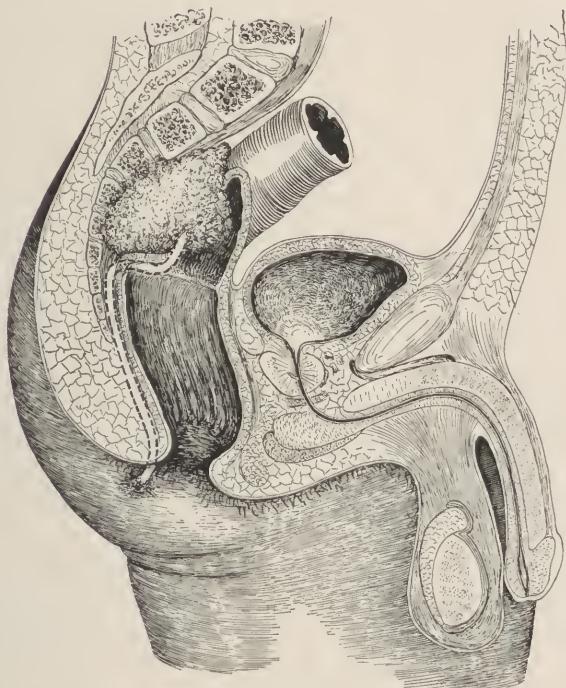


Fig. 587.—Rectosacral sarcoma complicated by fistula. Drawn after author's case.

are of the small round-celled variety, though spindle-celled growths are occasionally encountered.

The small celled sarcomata are usually soft, of more rapid development and malignancy than the large celled variety, their rapidity of growth depending principally upon the blood-supply and quantity of fibrous tissue in the neoplasm.

Sarcomata may originate in the subserosa, mucosa, or submucosa, usually beginning in the last, from which they extend to the mucous membrane and also spread outward to attack superficial and deep perirectal structures.

Anorectal sarcomata may be *melanotic*—black—or *non-melanotic*—white—depending on whether or not they contain *pigment*, the former being twice as common as the latter.

Melanotic Sarcoma—Black Cancer.—Black sarcomata are quite rare in the anorectal region, the author having observed but 6 cases, 2 of which have been recorded by Krouse, who tabulated the following 45 cases to show the ages and sex in which these tumors are most frequently encountered:

KRAUSE'S TABLE OF MELANOTIC SARCOMA

Between the ages of	Males.	Females.	Total.
10 and 20.....	1	0	1
20 and 30.....	5	0	5
30 and 40.....	1	5	6
40 and 50.....	5	3	8
50 and 60.....	7	7	14
60 and 70.....	8	2	10
Over 70.....	1	0	1
	— 28	— 17	— 45

Melanotic sarcomata are more common in the rectum than the small or large intestine, and have been mistaken for epithelioma because of the frequency of their occurrence at the anus.

These neoplasms, which may be black throughout or pigmented in one part and not in another, are less malignant than carcinomata. Such tumors are variable in shape and may be firm or soft—when degenerating—and exude a blackish discharge when ulcerated.

Lymphosarcomata.—These cancers originate in lymphoid tissue of the submucosa, and when fully developed feel to the touch as encapsulated, smooth tumors; the disease often attacks one lymph-node after another. Cancer cells are sooner or later transported through blood-vessels and lymph channels to produce sarcomatous lymphoid neoplasms distant from the original growth. Eventually the capsuled cancer ruptures or the tumor ulcerates, from which time the malignant process rapidly extends.

Chapter LI

Malignant Growths of the Rectosigmoidal Juncture, Rectum, and Anus (*Continued*)

SYMPTOMS, DIAGNOSIS

THE manifestations of *carcinoma* and *sarcoma* involving the rectum or anus differ but slightly, and at the inception of the malignant process symptoms are extremely vague.

Many patients are not aware they are suffering from cancer until the tumor has obtained considerable headway, which with mistaken diagnosis of ignorant or careless physicians accounts for the *inoperability* in approximately 65 per cent. of the cases.

The symptoms of anorectal malignancy vary, depending on the type, location, and size of the neoplasm and stage of degeneration; suffering is trivial in the *initial*, moderately distressing in the *intermediary*, and severe or exhausting in the *final* stage of cancer affecting the rectum or anus.

In the beginning the patient has a presentiment there is something wrong, or complains of vague abdominal or rectal uneasiness, mild, digestive disturbances, or slight variation as to the time and consistence of his evacuations.

Partially developed, large, and degenerating carcinoma or sarcoma involving the *rectosigmoidal* juncture, upper—ampulla—or lower rectum—anal canal—or anus invariably causes one or more of the symptoms enumerated and discussed below:

1. Constipation.
2. Fecal impaction.
3. Diarrhea.
4. Weight and fulness.
5. Tenesmus—straining.
6. Pain.
7. Discharge.
8. Hemorrhage.
9. Odor.
10. Malformed stools.
11. Tympanites, abdominal tenderness, and chronic peritonitis.
12. Dilatation.
13. Obstruction.
14. Perforation.
15. Menstrual, urethral, prostatic, and vesical disturbances.
16. Sphincteralgia.
17. Erosions of mucosa and skin and pruritus ani.
18. Procidentia ani and recti.
19. Metastasis.
20. Fecal incontinence.
21. Capillary angioma and pigmented warts.
22. Skin-tabs.
23. Constitutional symptoms.

Constipation.—Obstipation is an early manifestation of reetal malignaney, and progressively increases as the tumor enlarges, causing obstruction. Soon constipation alternates with diarrhea, and finally, when the bloek is marked or almost complete, loose movements prevail, beeause solid feecs cannot pass the obstrukcion and catharties are necessary to liquefy them.

Fecal Impaction.—Scybalæ and larger hard or semisolid feal masses invariably eollect in the rectum, sigmoid flexure, or colon; the presence of malignant stricture augments abdominal discomfort, gas aeeumulations, intra-intestinal pressure, and diarrhea by inereasing intestinal irritability, and by eausing stereoral ulcers by pressure neerosis of the mucosa, further enhaneing peristalsis and aggravating the diarrheal condition.

Diarrhea.—Frequent soft at first and fluid evacuations later are always an inereasingly troublesome manifestation of anorectal cancer, and in such eascs diarrhea ensues from three causes: (a) irritation of exposed terminal nerve filaments in malignant or stereoral ulcers—above the growth; (b) oelusion that retains solid and permits only fluid feees to eseape, and (c) gastro-intestinal derangement from abnormal diet and reflex disturbances.

Weight and Fulness in the Rectum.—These manifestations gradually beeome more noticeable as the tumor enlarges, and are responsible for much discomfort in late stages of the disease.

Tenesmus—Straining.—This is the most eonstant, persistent, and distressing symptom of cancer in the upper or lower reetum. Tenesmus is inaugurated with the growth and augmented as it enlarges, the tumor creating a desire to stool unreliced by defecation.

Finally, when the neoplasm attains eonsiderable size or presses upon sensory nerves in the anal eanal, the patient is unable to rest day or night owing to bearing-down pains, eonstant desire for evaeuation, terrifie straining during stool, and marked discomfort and exhaustion that follow vain efforts to relieve the bowel.

Pain is usually a symptom of rectal malignaney, but is a *late* and not an *early* manifestation, since it is caused by pressure of the mass upon nerves and exposure of nerve filaments by ulcers resulting from cancer degeneration or sealding of mueosa and skin by aerid discharge seereted by the lesions. Pain may be slight or agonizing, intermittent or continuous, is severe in the limbs and saeroeoeeygeal region when the tumor is on the *posterior*, and troublesome in the vesicle, prostatie, urethral, or perineal region when situated on the *anterior* reetal wall.

Patients usually eomplain bitterly of bearing-down pains

incident to tumor pressure and burning in the rectum or skin when the discharge keeps the mucosa and integument raw. Suffering increases as cancer extends, pain or cramps being felt in the rectum, neighboring organs, or abdomen until eventually it becomes unbearable and the patient succumbs unless relieved by morphin, colostomy, or extirpation of the growth.

Discharge.—A discharge the nature of which varies with character and development of the disease is an invariable complication of anorectal cancer. In the primary stage it is *mucoid*, in the intermediary—ulcerating—contains *blood* and *mucus*, and in the destructive—degenerating—stage the discharge is composed of mucus, blood, pus, and tissue *débris*.

Melanotic cancer secretes a *blackish* or pigmented, and colloid a clear or *yellowish jelly-like* discharge. Secretion from malignant tumors of the rectum may vary in amount from a tablespoonful to $\frac{1}{2}$ pint (250 c.c.) daily, and be evacuated with feces or independently at short or long intervals.

Cancerous discharges often have a characteristic *offensive odor* due mainly to retention that can be modified or almost eliminated by topical applications and medicated irrigations.

Hemorrhage.—Bleeding does not occur early, but is observed when the tumor attains headway and ulcerates or is injured. Hemorrhage is slight or profuse, depending on the extent and location of ulcers, and a large tumor may cause but slight, while a small ulcerating neoplasm may induce a dangerous loss of blood. Anemia occasionally ensues, but death from hemorrhage complicating rectal cancer is rare. Bleeding in these cases is augmented by constipated stools, straining, and introduction of the finger, enema tube, or proctoscope.

Odor.—Anorectal carcinomata are said to have a characteristic odor, but often such is not the case, and when they do the objectionable smell usually comes from the discharge retained in craters; this manifestation is *late*, though many surgeons believe it an early sign of malignancy.

Malformed Stools.—The form of evacuated feces is altered by rectal cancer and stools are *pencil-* or *tape-like* when evacuated through *annular* or *tubular* malignant stricture, *creased* if driven past a *projecting growth*, and *chopped off* in pieces when the disease incites the sphincter or levator ani muscle to contract *spasmodically*. When the neoplasm is high, fluid feces sometimes get by the constriction, solidify, and are evacuated without distortion.

Tympanites—Abdominal Tenderness and Chronic Peritonitis.—Gas distention is troublesome when there is obstruction, and the

abdomen is *tender* on palpation owing to tympanites, retained fecal accumulations, and pelvic peritonitis, usual complications of rectal cancer.

Early hypertrophy occurs, followed later by **dilatation** and **thinning** of the gut above the growth owing to distention by accumulated gas and feces.

Obstruction, partial or complete, is observed in the presence of large malignant tumors, evidenced in some by obstipation and straining, and in others by enormous abdominal distention, nausea, fecal vomiting, muscular rigidity, quickened pulse, and elevated temperature.

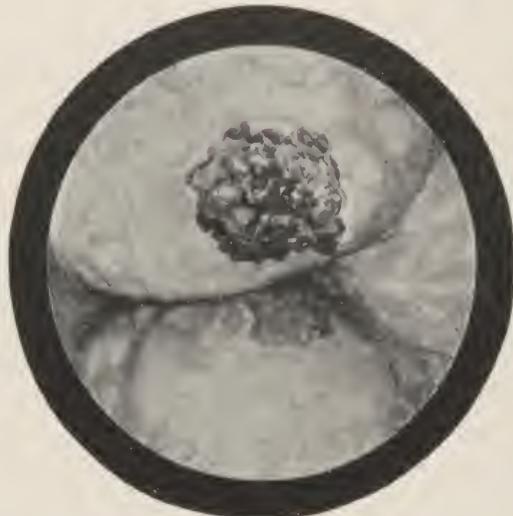


Fig. 588.—Proctoscopic view of rectal carcinoma showing protuberant masses and large deep crater-like ulcers.

Perforation may be caused by ulceration (Fig. 588) or by rupture of the bowel resulting from gas and fecal distention, and the patient quickly succumbs unless promptly relieved by operation.

Menstrual, urethral, prostatic, and vesical disturbances occasionally complicate anterior rectal cancer. In such cases frequent micturition, urinary retention, cystitis, abscess or fistula opening into an adjacent organ are among the most frequent complications.

Sphincteralgia or excruciating pain incident to persistent *contraction* of the sphincter and *levator ani muscles* is a manifestation of anal epithelioma and carcinoma attacking the anal canal.

Erosions of the mucosa and skin—pruritus ani, induced by the acrid discharge, keep many cancer patients miserable.

Procidentia ani and rectal invagination are among the rare manifestations of cancer produced by persistent straining and forcing the tumor downward by feces.

Metastasis.—Involvement of lymph-glands adjacent to and distant from the rectum by metastases is a usual complication of *carcinoma* and *sarcoma*, but secondary malignant deposits are rarer in *anal* than *rectal* and in hard than soft cancers.

In the author's cases metastases were observed in 50 of carcinomata (300), and in approximately 75 per cent. of sarcomata (14).

Enlarged *inguinal* glands are associated with anal skin cancer, while infected sacral, lumbar, retroperitoneal, and mesenteric lymph-nodes complicate malignant involvement of the rectum and sigmoid flexure. The liver, lungs, uterus, ovaries, kidneys, peritoneum, and omentum are the organs and structures most frequently attacked, the secondary cancer deposits structurally resembling the original neoplasm. The rectum never becomes involved through malignancy in other organs except by direct encroachment.

Fecal incontinence is a symptom of lower bowel cancer and may result from *fatigue* incident to persistent straining, destruction of the sphincter by the malignant process or pressure of the tumor upon nerves controlling the anal muscle.

Papillary angioma, wheat to coffee-grain size, pinkish in color, and *pigmented warts* scattered over the abdomen are occasionally signs of rectocolonic cancer.

Skin-tabs and discolorization about the anus caused by irritating discharge are a common complication of anorectal malignancy.

Constitutional Symptoms.—In the late or destructive stage of anorectal cancer constitutional symptoms appear, of which the following are the most important: *loss in weight, cachexia, anemia, anorexia, impaired digestion, neurogenic disturbances, ascites, hydro-nephrosis, anuria, dysuria, uremia, embolism, thrombus, septicemia, and exhaustion.*

Of the above general symptoms *cachexia* and *rapid loss in weight* deserve special emphasis, since they strongly indicate the malignant nature of the disease.

Symptoms of Sarcoma.—The manifestations of sarcoma are the same as carcinomata when the growth is in the rectum, but unfortunately the *former* cause more pain than the *latter*, because it attacks the lower rectum or perianal structures involving sensory, rectal, and cutaneous nerves.

Sarcomata are not so malignant, seldom degenerate, causing ulceration with discharge, and are usually to be seen or can be palpated as hard circumscribed or diffused tumors (Fig. 584).

DIAGNOSIS

To the observing physician having a comprehensive understanding of the symptomatology as outlined and who makes a thorough digital and proctoscopic examination of the lower bowel, the diagnosis of anorectal cancer should be comparatively easy.

Unfortunately, only about 65 per cent. of the author's patients afflicted with malignant growths in the rectum or at the anus were *operable* when they reached him, as they had been mistakenly

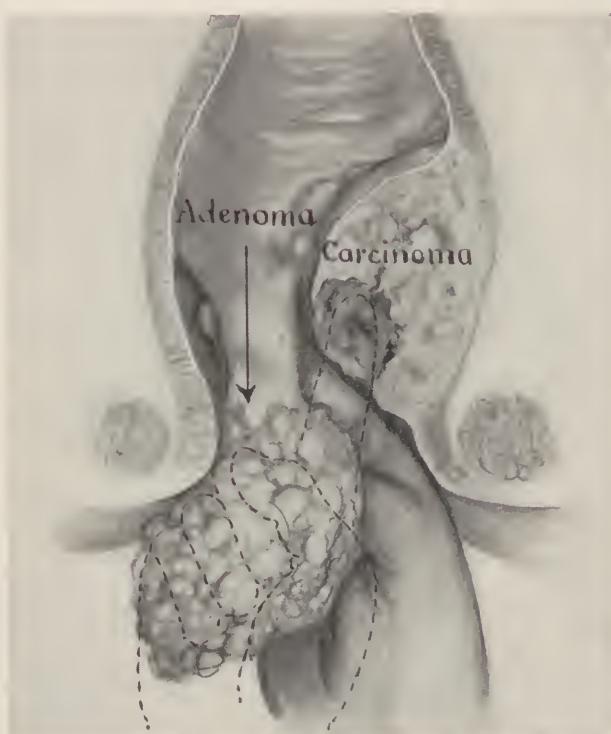


Fig. 589.—Differential diagnosis between *adenoma* (left) with a *pedicle* and *carcinoma* (right) attached by a *broad base* and having a large crater-like ulcer in the tumor.

treated for other conditions by physicians or surgeons who failed to examine the bowel, basing their diagnosis only on the statement of patients that they suffered from pain, obstruction, straining, offensive discharge, or other symptoms encountered in malignant and other affections of the anorectal region.

In attempting a diagnosis in cases of suspected anorectal cancer one should *palpate the buttocks*, *inspect the anus*, *digitally explore the rectum*, and *examine the bowel through the proctoscope*.

Preparation of Patient.—Examination is preceded by flushing and swabbing the bowel with cotton to clear it of feces, blood, mucus, and pus, which are offensive and interfere with digital and proctoscopic examination.

Position.—The posture chosen depends on the type and location of the growth. Any position is suitable for *anal*—epithelioma—which is in plain view, but a change of posture is necessary during examinations for *rectal* cancer.

When attempting a diagnosis of internal growths the author employs the *left Sims'* for digital exploration, *exaggerated knee-chest* for proctoscopic inspection—which favors inflation—and the *upright*



Fig. 590.—Proctoscopic view of rectal carcinoma—cauliflower type.

position, with finger in the rectum and patient straining down, to complete the examination of upper rectal growths.

Examination of the patient in the last-named position is essential, for when accompanied with straining by the patient it enables one to detect tumors high up that could not otherwise be discovered with the finger or proctoscope.

Palpation.—By palpation one determines the location, size, form, density, and sensitiveness of the tumor; valuable points to be considered when differentiating between growths in the rectum and buttocks.

Digital Examination.—Exploration is imperative, since practically all rectal cancers are within reach, and with the finger one

can ascertain their number, shape, height, mobility, degree of ulceration, encroachment upon other organs, if soft, hard, or fluctuating, and whether or not they are associated with other anorectal



Fig. 591.—Carcinoma of rectum, magnified. Above is a papillary adenomatous growth starting on the right from the normal mucous membrane. The papillary growth does not infiltrate, but on the left the surface becomes ulcerated and there is infiltration: first, into the submucous tissue, farther on, into the inner circular muscular coat, while at one point below this the outer longitudinal muscular coat is penetrated throughout its breadth by the malignant growth, which reaches as far as the submucous tissue.

affections. With the finger one can also determine whether or not the growth is pedunculated or attached by a broad base (Fig. 589), which is important, since pedunculated tumors are seldom malignant.

Proctoscopic Examination.—Inspection through the proctoscope should follow digital examination, since it enables one to determine the color of the mucous membrane, number, size, depth, and condition of tumors (Fig. 590) and ulcers, presence of polyps, fistula, or hemorrhoids; whether the growth is melanotic, pigmented, or has undergone colloid degeneration, to locate bleeding points.

The proctosigmoidoscope is never forcibly introduced, otherwise the degenerated gut may be *ruptured* and the patient die of peritonitis if the injury is more than 3 inches (7.62 cm.) or above the peritoneal attachment.



Fig. 592.—Radiograph of carcinoma located at the rectosigmoidal juncture.

x-Ray Examination.—Fluoroscopic examination is of doubtful value in the study of anorectal cancer, but radiographs of the sigmoid flexure and rectum taken following a barium enema help in ascertaining the location, size, and shape of malignant tumors involving the lower bowel (Fig. 592).

Microscopic Examination.—The microscope is not infallible, and in the author's practice pathologists have often reported *innocent* as *cancerous*, and *benign* as *malignant tumors*. The author places greater reliance on the history, *digital* and proctoscopic examination of the neoplasm than upon laboratory (Fig. 591) or *x-ray* findings, but resorts to the microscope to confirm the clinical diagnosis.

Differential Diagnosis.—*Epitheliomata* have been confused with *rodent*, *chancroid*, and *tubercular* ulcers attacking the anus, vegetating growths and keloids (Fig. 526) originating from scar tissue.

Rodent ulcer differs from squamous-cell cancer in slowness of growth, slight tendency to form metastasis, absence of cachexia, less loss of weight, and tendency not to recur when extirpated.

Chancroids are recognized by their number, inflamed serrated edges, fissured base, hypersensitiveness, lack of induration, copious, whitish discharge, and proneness to heal quickly when properly treated.

Condylomata—papillomata—though warty in appearance are diagnosed by their pedunculated attachment, clubbed extremity, tendency to form large conglomerate masses, characteristically offensive secretion, bleeding from slight trauma, there being secondary to leukorrhea, gonorrhea, or mucous patches the secretion from which constantly bathes the perianal skin, and differing from skin cancer by their curability.

In doubtful cases a section of the lesion or growth requires a microscopic examination to clear the diagnosis.

Carcinoma and *sarcoma* of the rectum are occasionally mistaken for *non-malignant tumors*—*polyps*—*inflammatory swellings*, *tubercular neoplasms*, *gummata*, *stricture*, *enlarged prostate*, *retroverted uterus*, and *ovarian or uterine tumors*.

Non-malignant growths are often diagnosed as cancer, which would be unnecessary if physicians understood that *proportionately as a growth is pedunculated, the danger of its being malignant is diminished*; carcinoma is never suspended from a pedicle and is attached by a broad, elevated base with infiltration of the superficial and deeper tunics of the bowel and adjacent structures.

Benign tumors are movable, not accompanied by loss of weight, cachexia, metastasis, typical odor, or profuse acrid discharge—signs that characterize malignant disease in the rectum; they do not form crater-like ulcers and show no tendency to recur unless incompletely excised or removed during the transitional stage of cancerous degeneration.

Inflammatory masses the result of chronic abscess and fistula or encysted foreign bodies are not likely to be mistaken for cancer by the careful observer, since they are flat, elastic, non-infiltrating swellings that do not cause loss of weight, cachexia, or other important symptoms of malignancy.

Tubercular neoplasms—hypertrophy tuberculosis—occasionally mimic globular, hard—scirrhouss—cancer, but require months or years to form, rarely degenerate, causing a discharge, are often

associated with tubercular lung foci accompanied by slight loss of weight, and marked gastro-intestinal disturbances, are not characterized by metastatic growths elsewhere, and do not recur when excised.

Gummata occur in subjects usually exhibiting luetic stigmata, and are distinguished from cancer by their saucer-like shape, lack of tendency to project into the bowel, absence of ulceration and discharge, and proneness to diminish in size under treatment.

Stricture is more often mistaken for malignancy than other rectal affections, but without reason, since most non-malignant stenoses are the result of chronic tubercular, syphilitic, gonorrhreal, entamebic, or bacillary coloproctitis, and require months or years to form unless caused by injury or operation.

Ulceration precedes stricture and follows cancerous obstruction, which is unaccompanied by marked loss in weight, cachexia, or infected lymph-nodes.

Through the proctoscope cancers appear as protuberant masses located on one side of the bowel, having deep or crater-like ulcers; while typical benign strictures are whitish in color, rigid, encircle a narrow segment of gut, have an irregular shaped opening, variable in size, that constricts the examining finger like a rubber band, and when they recur it is the result of contracting cicatricial tissue and not new growth.

Sarcoma is diagnosed from carcinoma by symptoms previously indicated and microscopic examination of sectioned tissue (Fig. 586).

In exceptional instances radiography or abdominal exploration is necessary to clear up the diagnosis of malignant neoplasms located in the upper rectum or sigmoid flexure.

Chapter LII

Malignant Growths of the Rectosigmoidal Juncture, Rectum, and Anus (*Continued*).

NON-OPERATIVE TREATMENT

General Remarks.—The treatment required for anorectal carcinomata, epitheliomata, and sarcomata is varied to meet indications depending upon: (a) Condition of the patient; (b) complicating disease; (c) type, size, location, mobility, and degree of degeneration of the neoplasm; (d) presence of metastasis in neighboring or remote glands and organs, and (e) whether or not cancer directly involves adjacent structures. When feasible anorectal cancer must be dealt with *radically*.

The treatment of malignant disease in the anorectal region and lower sigmoid may be:

1. Palliative.
2. Surgical palliative.
3. Non-surgical curative.
4. Radical—extirpation, resection.

Palliative Treatment.—Unfortunately, amputation and resection of the bowel in most cancer cases, approximately 65 per cent., is impracticable because the growth is *inoperable, glands and other organs are involved by metastasis*, the patient is *exhausted* or suffers from *cardiovascular disease, diabetes, chronic nephritis, pulmonary disease, marked anemia, peritonitis, fistula, or abscess* connecting with the surface or an adjacent organ, or neoplasms are *multiple, large, immovable, or extensively involve the peritoneum, adnexa, uterus, vagina, bladder, prostate, urethra, coccyx, sacrum, or buttocks*.

The author selects for radical operation with greater care than formerly, having learned extirpation is impracticable in many advanced cases, as the patient cannot withstand operation, recurrence quickly follows, or the sufferer is left in a more deplorable state than if treated by conservative measures.

Palliative treatment of anorectal cancer is unsatisfactory to patient and physician since a cure is never obtained, and is inadvisable except to mitigate suffering when there is a chance of eliminating

the neoplasm by *extirpation*, *x-ray*, *radium*, *caustic paste*, or other *agents* known to have cured cancer.

Much is accomplished toward alleviating pain, preventing obstruction, retarding progress of the growth, and prolonging life without radical operation; the author has carried many rectal cancer patients along in comparative comfort anywhere from six months to four and a half years without removal of the growth.

Conservative measures are also helpful when preparing the patient for operation, and in building up his general health following extirpation of the neoplasm.

The *palliative* treatment of cancer located in the sigmoid flexure, rectum, or at the anus consists mainly in:

1. Improving the general health.
2. Regulating diet.
3. Procuring comfortable evacuations.
4. Relieving suffering and insomnia.
5. Alleviating obstruction.
6. Treating the inflamed and ulcerated bowel.
7. Handling complications.
8. Employing electricity

Improving the General Condition.—Cancer patients are encouraged by cheerful words and manner, not being informed of their hopeless condition, and strengthened by supportive measures—fresh air, mild exercise, nourishing food, iron, strychnin, oil or vegetable emulsions, and administration of remedies that soothe tired nerves.

Regulating the Diet.—The variety and amount of food permitted depends on the extent of ulceration and degree of obstruction. In the beginning one may eat almost any food, but when obstruction is marked the quantity is less, taken more frequently, and includes articles leaving little residue—milk, concentrated soup, beef juice, soft-boiled eggs, zoölak or buttermilk, and small amount of meat. The diet may be reinforced by eggnoths, emulsions, and abundance of water, which tend to soften feces and forestall fecal impaction by enabling them to more easily pass the obstruction.

Procuring Comfortable Evacuations.—Regulating movements is extremely difficult when the growth markedly obstructs the bowel, for the patient complains of diarrhea at one time and constipation at another, since solid feces cannot pass the block. Often two or more comfortable, semisolid evacuations are procured daily through the administration of olive or mineral oil, 3 ss (15.0), morning and

night, to lubricate the bowel, a dinner pill or saline mineral water, stewed fruit, or other laxatives suitable to the case in hand, but drastic purgatives are contraindicated since they increase the patient's suffering.

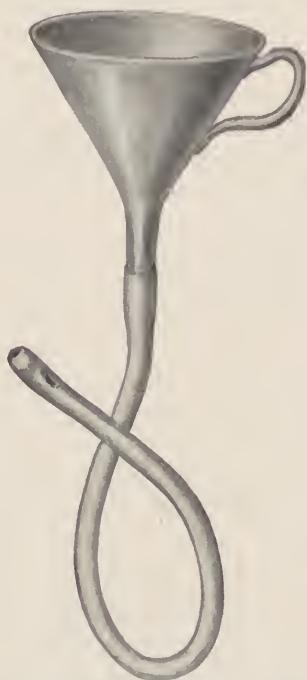


Fig. 593.—Funnel and tube employed when giving high colonic enemata, high oil, and soapsuds enemata to relieve fecal impaction located above malignant tumors in the rectum and colon.

tion of starch-water, ʒ iv (120.0), and laudanum, ʒ ss (2.0), or use of the accompanying ointment through a pile-pipe.

R. Cocaine hydrochlor	.....	gr. viij	0|53;
Ext. belladonnae	{		
Hydrarg. chlor. mit.		ʒj	4|0;

Ungt. stramonii qs. ad. ʒj 30|0.—M.

Pain located in the abdomen, lower bowel, or sacrococcygeal region, down the limbs, vicinity of the prostate, bladder, uterus, vagina, or elsewhere, not relieved by milder remedies, is controlled by suppositories composed of:

R. Ext. belladonnae .....	.....	gr. iss	0|1;
Morphine sulphat.	.....	gr. j	0|06;
Cocoa butter .....	.....	q. s.	

Misce et fiat suppos. No. viij.

Sig.—Introduce as often as required.

When these agents fail and feces accumulate above the tumor, they are best removed with peroxid of hydrogen, warm soapsuds, ox-gall, or oil (Fig. 593) enemata, or by saline irrigation after being broken up through the proctoscope.

Relief of Suffering and Insomnia.—Discomfort due to erosions of mucosa and skin by acrid discharges is alleviated by hot boric acid enemata and zinc ointment applied to the perianal skin. Bearing down and other rectal pains are mitigated with aspirin, gr. x (0.6), hot soothing injections, bismuth, oil emulsions, removal of feces, *débris*, toxins, and acrid discharges above and below the growth by warm saline irrigations, application of an electric heating pad over the sacrum or pelvis, injection of starch-water, ʒ iv (120.0), and laudanum, ʒ ss (2.0), or use of the accompanying ointment through a pile-pipe.

In exceptional instances when bearing down pains are continuous, with an incessant desire to evacuate the bowel, the abdomen distended with gas and feces, and the patient suffers excruciatingly, morphin, gr. $\frac{1}{4}$ (0.016), hypodermically is indicated; but where the sufferer is exhausted from insomnia, bromids, chloral, veronal, trional, or medinol are substituted for opiates, as they procure the much needed rest and are less constipating.

When fermentation and putrefaction are troublesome, gastrointestinal discomfort is mitigated and digestion improved by administration of beta-naphthol, salol, bismuth, or charcoal, gr. xv (1.0), after meals.

Alleviating Obstruction.—Frequently obstructive manifestations are abated by regulating diet and stools in accordance with the foregoing plan, but when this fails the strictured opening is enlarged with the finger, bougie, or inflatable rubber bag sufficiently to permit introduction of proctoscope, through which the bowel is irrigated free of feces and retained débris.

When the block is not relieved in this manner, forcible *divulsion*, *proctotomy*, or *colostomy* is indicated to prevent acute obstruction. Gradual or forcible dilatation as well as the incision of cancerous stenoses is extremely dangerous, and is not practised when the block is 3 inches (7.62 cm.) high or above the peritoneal attachment, because if the bowel is ruptured fatal peritonitis ensues. In one or two instances the author has relieved obstruction by cureting or burning an opening through low-lying obstructing cancers, and in other cases has prevented acute obstruction by inserting and leaving *in situ* his *spring stricture dilator* (Fig. 503).

Treating the Inflamed and Ulcerated Bowel.—Frequent irrigation of the bowel above and below the neoplasm with a warm solution of ichthyol or balsam of Peru 2, boric acid 4, or argyrol 5 per cent. is comforting to the patient, since it cleanses the rectum of irritating cancerous discharge, which if retained has an offensive odor, scalds the mucosa, and excoriates the skin as it oozes through the anus. Medicated irrigations also soothe the inflamed mucosa, heal superficial lesions, and cleanse crater-like ulcers in the growth of secretion, bacteria, and débris.

Handling Complications.—Distress incident to complicating hemorrhoids, procidentia, polyps, vegetations, proctitis, abscess, fistula, and sphincteralgia is relieved by the conservative or operative treatment recommended in the chapters set apart for these conditions.

Electricity.—Electrotherapeutists make liberal claims regarding the value of electricity in treatment of cancer, but results

obtained by the author have been disappointing, since benefits derived from different currents have been confined to their psychic action, diminution of pain, and occasional temporary shrinkage of growths that followed galvanopuncture and slow cauterization of the tumor.

Surgical Palliative Treatment.—When the above therapeutic agents do not bring relief in inoperable anorectal cancer cases *surgical palliative treatment* is resorted to, otherwise the patient quickly succumbs to pain, exhaustion, infection, acute obstruction or perforation, and peritonitis.

Surgical palliative procedures employed in the treatment of malignant disease of the anorectal region are:

1. Forceful divulsion.
2. Curettage.
3. Cauterization.
4. Colostomy.
5. Proctotomy.

Forcible Divulsion.—Rapid dilatation to relieve obstruction is performed under general anesthesia by introducing one finger after the other until the caliber of the stenosis is sufficiently enlarged, following which the bowel above and below is washed out, swabbed with ichthyol 10 per cent., and drained, and a Gant spring dilator is introduced to prevent recurrence of obstructive manifestations.

This procedure is contraindicated when occlusion is above the peritoneal attachment; bougies and ordinary mechanical dilators are objectionable because they frequently do irreparable harm before the operator is aware of injury.

Curettage.—The author has in a few instances made an opening through large *hard* cancers and removed sections of or dug a trough along *soft* or *medullary* tumors with a curet to relieve obstruction in patients who declined or were too weak to submit to a more desirable operation. Curettage is dangerous because it is accompanied by profuse bleeding, the rectum may be perforated and a ragged surface is left favoring absorption and infection.

Cauterization.—Better work is accomplished with the thermo- or electrocautery, as the same object is accomplished with less risk, an outlet through the cancer mass being made with little danger of hemorrhage or infection, and a smooth wound, easily dressed, is left.

After making an opening through cancers with curet or cautery the author introduces a large self-retaining rubber tube through which discharge, gas, and feces escape, with little annoyance to the patient.

Curettage and cauterization are contraindicated except as a last resort in treatment of inoperable, extensive, or recurrent malignant anorectal neoplasms, because scraping or burning tumors *stimulates* rather than retards neoplastic cell proliferation.

Proctotomy.—When extirpation is inadvisable and obstructive manifestations are urgent *external* or *internal* proctotomy is indicated provided the growth is within 3 inches (7.62 cm.) of the anus.

External—complete—proctotomy (Fig. 505) consists in guiding a blunt bistoury to a point above the obstruction, and withdrawing the knife downward and backward, incising the growth, rectum, sphincter, and outer structures almost to the coccyx (Fig. 505), after which the cut is tightly packed to arrest profuse bleeding. The large wound completely relieves obstruction, insures free drainage, and is more satisfactory than forcible divulsion, which must be repeated at short intervals unless the author's self-retaining dilator (Fig. 504) is inserted.

Internal—partial—proctotomy is to be condemned because of frequency with which it is followed by infection, since the ulcerated cancerous bowel is split without providing drainage by carrying the incision through the sphincter.

Colostomy.—Of the surgical palliative measures enumerated, colostomy—see Chapter XCIV, Vol. III—is most valuable; since it permanently prevents obstruction; puts the malignant bowel at rest; permits nurse or physician to flush the rectum throughout, keeping it free of irritating discharges, bacteria, toxins, dried mucus, and tissue *débris*; allows use of soothing and healing medicated applications to the inflamed and irritated mucosa, which also disinfect and deodorize offensive secretions coming from degenerating crater like ulcers in cancerous masses.

An artificial opening in the side or *central abdomen* (Figs. 1032, 1034) is more objectionable than a vaginal anus (Figs. 1055, 1056) on account of the unnatural site of the opening, but objectionable features incident to frequent and involuntary evacuations are mainly avoided by proctologists familiar with the right technic practised in establishing a controllable artificial anus.

Only about 5 per cent. of the author's colostomized patients complain of feces escaping at inopportune times, while the majority resort to enemas or light laxatives to stimulate daily evacuations when ulcerated areas about the artificial opening have healed.

Colostomy accomplishes nothing toward a cure, but materially diminishes suffering, lengthens life, and retards the new growth; but when followed by supportive treatment and through-

and-through rectal irrigations improves digestion, controls diarrhea, promotes an increase in weight, and sometimes is followed by slight or marked shrinkage of inflammatory exudates or the growth, especially when sera, high frequency, *x*-rays, or radium are employed with other therapeutic agents.

In these cases the author has succeeded in extirpating rectal cancers that were inoperable before the formation of an artificial anus, and carrying out of the above-mentioned therapeutic measures.

Artificial ani are not indicated in the treatment of non-ulcerating and anorectal cancers not causing obstruction, since the patient is kept comfortable by other measures and colostomy does not completely relieve pain caused by malignant disease involving the bone or sacrococcygeal nerves.



Fig. 594.—*Procidentia recti et sigmoidæ* following colostomy for inoperable carcinoma of the rectum.

Patients colostomized for rectal cancer live for a short or considerable time, or succumb in a few weeks; the majority die within nine months, and three-fourths succumb within one year, and very few survive eighteen months or longer.

Several years ago (1908) the author tabulated 167 of his colostomy cases to determine how many lived eighteen months or longer; in this series it was found that 29 lived one and a half years or longer, duration of life being as follows:

Lived 18 months.....	15
Lived 21 months.....	7
Lived 24 months.....	3
Lived 30 months.....	2
Lived 36 months.....	1
Lived 48 months.....	1
	29

In a larger number of patients colostomized since the above table was compiled the duration of life subsequent to the establishing of an artificial anus remained about the same.

Temporary (Fig. 1025) or *permanent colostomy* (Fig. 1031) is frequently employed as a preliminary step to or in connection with rectal extirpation and resection, but since the indications for *artificial ani* in connection with rectal cancer and other diseases and the steps in *colostomy* are fully discussed in Chapter XCIV, their further consideration is unnecessary here.

Non-surgical Curative Treatment.—Numerous non-operative cancer cures have been suggested by the profession, itinerant doctors, and advertising cancer specialists, but statistics concerning such remedies are less reliable than the data of surgeons relative to extirpation of intestinal malignant growths, which differ widely.

Cures have been recorded through the agency of *radium*, *x-rays*, *Percy's slow cooking procedure*, *caustic pastes*, and other agents.

In the author's practice measures just mentioned are never substituted for *surgery* in the treatment of cancer except when the growth attacks the *perianal skin—epithelioma*—or is inoperable, but they are sometimes useful following extirpation to lessen chances of recurrence; radical operation accomplishes the quickest and most lasting results in malignant disease of the anorectal region.

Radiotherapy.—Since the discovery of radium by Mme. Curie about two decades ago radio activity has been successfully employed in the treatment of keloids, angioma, lupus, and rodent ulcer, and epitheliomata have been temporarily arrested or cured by radiotherapy.

Of 548 cases of malignant disease treated at the London Radium Institute—1913 report—there was *one* cure; $9\frac{1}{10}$ apparently cured, 33 improved, and $6\frac{8}{10}$ per cent. reported as having died.

Radium intelligently applied sufficiently often in suitable dosage sometimes destroys many superficial and some deep cancer cells, and, when effective, converts part or all neoplastic into cicatricial tissue (Fig. 595).

Under radiotherapy anal epitheliomata may rapidly and permanently disappear, but in a large percentage of cases irradiation does not benefit the patient, causes the lesion to heal at one place while it breaks down at another, or affects a temporary cure, followed by recurrence in a few weeks or months. Radium is practically useless from a curative viewpoint in the presence of *metastasis* in other organs, and the author is of the opinion that radiotherapy is totally unreliable in the treatment of cancer located in

the rectum or higher up, and sometimes stimulates glandular cancer to more rapid growth.

He has handled several rectal cancer patients undergoing irradiation where pain was mitigated, the discharge lessened, and the tumor was temporarily diminished in size, but these sufferers eventually died from extension of the neoplasm or metastasis in neighboring or distant organs; he believes the employment of radium in this class of cases should be limited to *anal epitheliomata*, *getting the patient ready for and following extirpation, minimizing suffering, and extending life following colostomy.*

The author has treated several patients suffering from large ulcers or extensive destruction of tissue in the rectum or perianal



Fig. 595.—Partially healed anal epithelioma treated with radium. (Author's case.)

region the result of radium burns, which convinced him that radium should not be employed except by physicians specializing in radiotherapy and by them *cautiously* in carefully selected cases of anal cancer.

Roentgenotherapy—x-Rays.—The indications for *x*-rays in the treatment of anorectal cancer are about the same as for radium, and the most that can be said for roentgenotherapy is that it occasionally improves the condition of the patient prior to extirpation, delays or prevents postoperative recurrence, and sometimes arrests or cures *anal epithelioma*. Consequently, valuable time should not be lost in attempting to cure rectal or glandular cancer with roentgenotherapy. Radium and *x*-rays have been combined in the treatment,

but no apparent advantage has come from the procedure, barring psychic effect.

Radiotherapy and *roentgenotherapy* should be classified as palliative agents in so far as they concern malignant disease of the colon, sigmoid, or rectum proper (Fig. 596). The author has observed 2 cases of extensive sloughing of the perianal region from *x-ray* burns made when the operator was treating anorectal cancers.

Percy's Slow-cooking Procedure.—The value of slow heat continuously applied for a considerable time to the interior of cancerous masses was emphasized by Percy in 1912, who claimed



Fig. 596.—Extensive secondary carcinomatous involvement of the rectum, buttocks, and thigh, as it appeared sixteen months following sacral proctectomy. Following extirpation this patient regularly received *x-ray* treatments.

heat thus applied killed cancer cells without destroying normal tissue. The cancer is exposed and treatments made through a large water-cooled speculum by forcing a suitable sized cautery point into the tumor, at the same time regulating the current so that heat may slowly penetrate, but not burn the growth; heat so low that the cautery point will just char white paper.

Several cures of uterine cancer and a number of disasters from Percy's method have been recorded, but the writer has been unable to find a case of rectal cancer cured in this way.

In 3 instances the author has mitigated symptoms and retarded malignancy of the anorectal region by this process, but patients eventually died from extension of the growth or metastasis

in other organs. The method is unsafe in the hands of inexperienced surgeons, who may perforate the bowel, destroy normal tissues, or painfully burn the perianal tissue.

Death from infection has followed the cooking process as a result of necrotic extension from the coagulated area, which favors bacterial invasion and absorption of toxins into the circulation and possible involvement of peritoneum through sloughing.

Percy's method will not become popular until it is ascertained that cancerous is more susceptible to slow heat than normal tissue. According to our understanding of its application and usefulness the procedure should be reserved for *inoperable* cancer and recurrent nodules, either of which it may have stimulated to extend more rapidly than before by burning.

Diathermy.—This form of cauterization is carried out with the low potential high-frequency current liberally applied. The spark produces active tissue destruction without causing pain, but its curative value, which is doubtful, remains to be proved.

Caustic Pastes.—Escharotics, particularly *zinc* and *arsenic* in varying strengths employed as a paste, have occasionally proved curative in anal or skin, but have no place in the treatment of rectal cancer.

Caustic paste applications induce necrosis of cancerous tissue, which if poulticed suppurates, leaving a comparatively clean ulcer that in favorable cases may heal under soothing and stimulating medications, of which *scarlet-red* 5 per cent. in boric acid ointment ranks first, since it leaves a softer scar.

Escharotics cause excruciating pain for hours and it is difficult to restrict their action to diseased tissue.

A satisfactory paste is made by mixing equal parts of zinc chlorid and flour, diluting with water to the desired consistency, or in the following manner:

R.	Chlorid of zinc	2 parts;
	Muriate of antimony	2 "
	Flour	3 "

Water sufficient to make soft paste.—M.

Sig.—Apply on gauze cut to the proper size and retained in place by adhesive strips.

Miscellaneous Cancer Remedies.—*Potassium iodid* occasionally reduces the perineoplastic inflammatory area and minimizes distress, but does not destroy cancer cells.

Colloid metals—copper and selenium in minute particles—suspended in water through an electric or chemical process, injected under the skin or into the muscles every three or four days, are

said to possess antineoplastic cell propensities, but there is no clinical data to confirm the claim.

Coley's mixed toxin—*Streptococcus erysipelatus*; *Bacillus prodigiosis*—injections have in rare instances been effective in sarcoma, but do not influence carcinoma.

Sera, organotherapy, and other vaunted cancer remedies have been exploited, but none except those previously discussed deserve consideration.

Chapter LIII

Malignant Growths of the Rectosigmoidal Juncture, Rectum, and Anus (*Continued*)

SURGICAL TREATMENT—HISTORY—GENERAL REMARKS—CLASSIFICATION OF OPERATIONS

History and Evolution of Anorectal Excision and Resection.—
Perineal Excision—Lisfranc's Operation.—Faget in 1739 excised the rectum for a dissecting perirectal abscess; Morgagni in 1824 attempted extirpation, but abandoned the operation; Lisfranc in 1826 successfully excised the rectum for cancer; Pinault in 1829 published 9 similar operations—perineal—performed by Lisfranc, who in 1833 described his procedure—perineal excision—limited to movable growths within reach of the finger. His operation was favorably received in some quarters and severely criticized in others; the technic was modified by Velpeau, Vidal de Cassis, Chassaignac, Demonvilliers, Recamier, and Diessenbac.

Following Verneuil's suggestion, 1873, Kocher (Fig. 620), Byrd, Lange, Bardenheuer, and Arnd successfully removed the rectum by excising the coccyx to obtain more room.

Sacral Excision—Kraske's Operation.—Bardenheuer in 1880 proposed partial sacral excision to obtain additional room, a procedure carried out and popularized by Kraske in 1885, who reported 2 cases thus operated. Kraske chiselled away the left lower half of the sacrum and removed the coccyx (Fig. 620), a procedure that enables the operator to isolate the rectum from above, open the peritoneum, and excise high growths previously inoperable; save for this feature the operation has little to recommend it.

With a view to reaching growths in the upper rectum and lower sigmoid, preserving the ligamentous and osseous pelvic support, avoiding division of important nerves, lessening danger of injury to vessels supplying the lower bowel, diminishing danger of incontinence and fecal fistula, shortening the operation or minimizing infection, Kraske's operation has been modified by a number of surgeons, including the author.

Bardenheuer (Fig. 620) divides the sacrum transversely immediately below the third foramen; Kocher (Fig. 620) in extreme

cases goes as high as the second sacral foramen; Rose removes coccyx and sacrum on a level with the second foramen; other surgeons make a lateral or transverse resection of the sacrum at different levels, and the majority of operators advise removal of coccyx except in low-lying cancers.

Osteo-integumentary Flap Operation.—Von Heincke, to preserve the *fourth sacral nerves* and *pelvic support*, splits the bone centrally and transversely below the fourth sacral foramen and reflects the flaps during operation; Gussenbauer formed an osseous flap by dividing the sacrum transversely below the second sacral foramen; Levy (Fig. 620) made a rectangular osteo-integumentary opening on a level with the fourth foramen and pulled the tissue downward; Walker divided the sacrum anteriorly, using the peritoneum as a hinge in turning the flap upward; Hegar severed soft parts and bone between second and third foramen, lifting coccyx and sacrum upward; but the Rhen-Rydiger (Fig. 620) procedure outlined below has attained greater popularity than most sacral operations because of its simplicity and effectiveness.

Beginning at the posterior superior spine of the ileum, a *curvilinear* incision is made $\frac{1}{2}$ inch (12.70 mm.) from the left edge of the sacrum to the coccygeal tip, and thence downward in the median line to the anal margin, dividing skin and sacrosciatic ligaments; at the original incision a parasacral cut is made below the third foramen, and the bone chiseled through; following which the sacrum is freed from its anterior attachments, the sacrococcygeal lid is turned back to the right, the rectum is amputated or resected, and the operation completed by replacing and suturing the osteo-integumentary flap.

Tuttle improved the Rhen-Rydgyier operation by dividing the bone below the fourth sacral foramen to save nerves, making incisions so the flap can be drawn to the left and backward (Fig. 629), which is more convenient.

Vaginal Excision.—Desquins suggested vaginal excision, and the same year—1890—Norton performed the operation; during the following decade vaginal proctectomy was championed by McArthur—1891, Campenon—1894, Vautrin—1895, Price, Byford, Bristow, Branham—1896, Gersuny, Sternberg—1897, Liermann, Earle—1899, Murphy—1900, and other surgeons, including the author (see Figs. 634–641).

Since 1891 vaginal excision and resection have been performed with increasing frequency due largely to the impetus given the operation by Murphy, who outlined the technic and reported 5 successful cases.

Abdomino-anal, Abdominoperineal, Abdominosacral Excision
—**Combined Operation.**—Czerny in 1884, failing in an attempt to remove a high rectal cancer by the perineal route, opened the abdomen and successfully completed the operation, thereby unintentionally performing the first abdominoperineal proctectomy. Maunsell in 1892 deliberately incised the peritoneum, introduced mattress sutures from without into the bowel, by the aid of which he invaginated and drew the malignant gut through the dilated anus, following which the tumor was excised and gut ends approximated and sutured. Weir in 1901 modified this operation by ligating the inferior mesenteric artery, mobilizing the sigmoid and rectum by lateral peritoneal incisions and dissections to the coccygeal tip, doubly ligating and dividing the rectum below the tumor, bringing the proximal end of gut through the abdominal wound and excising the growth; seizing and withdrawing the rectal end through the anus; bringing the upper through the lower inverted segment with forceps, inserting fixation needles, suturing the ends, and stitching peritoneum to bowel; closing the abdomen and completing the operation by inserting tubes one into the pelvic space through an incision anterior to the coccyx and another into the rectum to permit gas to escape.

Chaput in 1894 performed the first abdominosacral proctectomy, later Gaudier in 1895 and then Challot in 1896 successfully removed rectal cancers by the abdominoperineal route, having previously ligated the superior hemorrhoidal artery, and Boeckel, the same year, was compelled to open the abdomen to complete rectal extirpation attempted from below (see Figs. 642–645).

Giordana in 1896 devised and performed a combined abdominoperineal operation for high rectal cancer, bringing the proximal end of gut through a split in the gluteal muscle and suturing it to the skin, instead of establishing an artificial anus like previous operators; Quénau and Reverdin performed the combined operation in 1896; the former isolated the rectal end of the gut first, while the latter reversed the procedure, and in the same year Tuttle resected a cancerous rectum by the abdominosacral route.

Resection with Hysterectomy.—Edebholz in 1901 advised a one-stage operation, including abdominal hysterectomy, resection of malignant bowel, with end-to-end anastomosis of rectum and sigmoid for high rectal cancer in women.

Coloproctostomy.—Howard Kelly in 1895, following resection of a growth at the rectosigmoidal juncture, to avoid an artificial anus, implanted the sigmoid in the anterior wall of the rectum, the upper end of which had been previously closed (Fig. 509).

The author has successfully performed this operation in two instances.

Special Technic of Other Operators.—In the evolution of *proctectomy* to date, in addition to the above the following surgeons have suggested new features in attempting to improve the technic of rectal extirpation:

Hochenegg, to avert fecal fistula following resection, devised the pull-through method, which consists in *denuding* the *lower rectum* of mucosa, drawing the *upper segment* through the denuded lumen, and suturing it to the skin (Fig. 607), a procedure having considerable merit.

Morestin, to minimize danger of incontinence, spliced the bowel by removing the musculature from upper mucosa of the anal extremity before suturing bowel ends.

Gersuny attempts to prevent incontinence following amputation by twisting the rectum on its axis from a half to three-quarters of its circumference (Fig. 602), which diminishes the lumen, retarding the involuntary evacuation of solid but not fluid feces.

Willem, following excision of the sphincter, draws the rectum through a *split* in the *gluteus maximus*, suturing it to the skin (Fig. 603), aiming to prevent involuntary stools, an ineffective operation.

Rydygier brings the gut through the *pyriformis* muscle, suturing it to the skin, which is not as satisfactory as Willem's method.

Chetwood claims to have overcome incontinence by suturing ribbon-like bands of the *gluteus maximi* snugly around the terminal rectum in a *figure-of-8* fashion (Fig. 603, A), an unreliable procedure in the author's hands.

Gant, to minimize fecal incontinence following extirpation of the lower rectum, snugly sutures the *levator ani* about the gut, narrows the lower end of the bowel by removing a V-shaped segment, and then sutures it to a buttonhole incision made in the skin (Figs. 604, 605).

Lange, to facilitate anastomosis following resection and relieve subsequent tension upon the bowel, encircles the anus with an incision sufficiently deep to divide anterior fibers of *levator ani*, which is followed by marked upper retraction of the anus.

Keene, after establishing an artificial anus and extirpating the growth by the sacral route, closed and replaced the rectal stump (Fig. 601).

Balfour in high resection sutures a rubber tube into the proximal gut, draws it down through the rectal end, and makes traction on

it, which facilitates anastomosis and subsequently lessens danger at the suture line (Fig. 643).

English surgeons precede the combined operation and perineal excision by establishing a permanent *artificial anus*, which lessens mortality from infection.

General Remarks.—Extirpation of cancer is the only treatment that offers a permanent cure, and to be effective the operation must be sufficiently wide to include involved adjacent structures, infected lymph-nodes (Fig. 598), and vessels leading from the growth (Fig. 660).

Occasionally cancers which upon examination at first appear hopeless are operable subsequent to *colostomy*, *functional rest*, *irrigation*, and *irradiation* or *x-ray treatment*, which diminish the peri-inflammatory process and mobilize the bowel; the partial removal of growths is sometimes justifiable in hopeless cases, because it extends life, and makes the patient more comfortable while he does live.

Great responsibility rests on the surgeon because he must determine whether treatment is to be *palliative* or *radical*, but in border-line cases a choice may be left with the patient.

When condition of the patient is good, involved gut movable, and neighboring structures are normal or slightly diseased, the neoplasm, regardless of duration, size, or location, is *extirpated*.

Contraindications to anorectal excision and resection for cancer are *acute obstruction*, *immobility of the gut*, *extensive involvement of neighboring organs*, *metastases in remote lymph-nodes* in the intestine, lung, liver, spleen, or elsewhere, when patient is decrepit, markedly devitalized or in a dangerous condition from exhaustion, nephritis, diabetes, unusually high blood-pressure, arteriosclerosis, pulmonary tuberculosis, sepsis, heart lesion, chronic bronchitis, senility, extreme weakness, or other conditions that in any way make the patient's recovery doubtful following extirpation.

Extreme obesity is sometimes a contraindication because it decreases resistance, makes operation difficult, and prolongs convalescence. Women are easier operated, having a wider pelvis, and withstand extirpation better than men.

The percentage of permanent cures following rectal extirpation is higher when operation is performed within the *first four months* than when radical treatment is delayed.

While extirpation is the procedure of choice and the technic has been greatly improved, it is not entirely satisfactory because of accompanying high mortality, growths often recur, and ocea-

sional necessity of establishing a permanent artificial anus previous to or during operation.

Routine extirpation is impossible for all rectal cancers because an extensive growth is sometimes easily removed and what appeared to be a simple may develop into an exceedingly difficult operation. Extirpation is rapidly displacing colostomy alone, since surgeons no longer hesitate in removing growths located in the rectum, sigmoid flexure, or colon.

Favorable results following excision and resection for anorectal cancer are largely dependent on: (a) preoperative treatment to improve general health; (b) timely, careful preparation of the patient for excision; (c) dexterity and skill of the surgeon; (d) protection of operative field by preliminary anal purse-string suture (Fig. 608), division of rectum by cautery between double ligatures or clamps (Fig. 637); (e) replacing blunt with clean-cut dissection; (f) avoiding hemorrhage by ligating main arteries (Fig. 642) without interfering with nutrition; (g) mobilizing the gut by lateral peritoneal incisions (Fig. 642) to facilitate the operation, preventing tension and sloughing; (h) widely removing lymph-vessels and glands; (i) inserting anterior and posterior drains (Fig. 615); (j) anchoring a large rubber tube in the rectum which is left projecting through dressings to permit gas and feces to escape, and (k) employing hypodermoclysis during or after operation when the patient exhibits evidences of shock.

Choice of Operation.—Choice of procedure for rectal extirpation depends on the patient's strength, blood-supply, complicating disease, sex, extent, and location of the neoplasm.

The ideal operation combines minimum danger with a maximum chance for permanent recovery, factors that favor *perineal* or *vaginal* excision when the patient is depleted or the growth is situated in the *lower* or *middle* rectum.

Sacral extirpation with or without bone-flap modification meets indications for cancer in the *upper third* of the rectum. *Abdominoperineal* or *abdominosacral* proctectomy is preferable for tumors involving the *lower sigmoid* or rectosigmoidal juncture, while *abdominal resection—colectomy* or *sigmoidectomy*—is the operation of choice for malignant disease located in the colon or sigmoid flexure.

Perineal anal excision (Figs. 646, 647) is reserved for cancer of the terminal rectum, *epitheliomata* and *partial—local—proctectomy* (Fig. 646) is resorted to in rare instances in the removal of *small superficial localized incipient malignant nodules*.

Preliminary or permanent colostomy (Figs. 1044, 1076) with extir-

pation is indicated when the bowel above the growth cannot be freed of feces, to shorten the combined operation, lessen danger of infection, and diminish liability to tension and sloughing which frequently follows suturing the proximal gut to the anus.

The formation of a permanent artificial anus unquestionably lessens the mortality of rectal extirpation and facilitates healing of the wound.

Resection and *re-anastomosis* (Fig. 638) is impracticable in all excisions when the growth is below the *peritoneal reflection*, as complete union fails and posterior fecal fistula ensues. When the tumor is high and it is questionable what should be done choice of operation is deferred until the abdomen is opened and gut examined.

Perineal and *sacral* are safer than *combined extirpation* for men, tubercular and obese subjects, and patients having heart or kidney lesion who withstand shock poorly.

Comparative Merits of Amputation and Resection.—The rectum and lower sigmoid may be extirpated by *amputation* or *resection*. In the *former*, following removal of growth, the bowel is sutured to the skin of the perianal, coccygeal, sacral, or inguinal region (Figs. 606, 624), and in the *latter* proximal and distal ends of the bowel are anastomosed by sutures or Murphy button above the peritoneal attachment, but neither procedure is practical in all cases.

In doubtful cases experienced surgeons *mobilize* the bowel before determining whether the gut should be amputated or resected.

Resection is the ideal procedure because the neoplasm is excised and continuity of bowel is *immediately* re-established, leaving the sphincter intact; while in *amputation* the anal muscle is usually removed, resulting in the patient's having partial or complete fecal incontinence. Resection is indicated for malignancy of the colon and sigmoid, but is rarely applicable for low cancer, because the rectum lacks a *peritoneal* tunic and sutures give way at the anastomotic line, leading to infection, abscess, fecal fistula, or stricture.

The following are the more important *disadvantages* of rectal *resection*: (a) the operation is difficult and long; (b) accompanied by slight or severe shock; (c) hemorrhage is hard to control; (d) satisfactory union is rarely obtained since the rectum is devoid of peritoneum; (e) it is impractical for extensive growth because bowel ends cannot be approximated; (f) limited room in the pelvis often precludes anastomosis; (g) recurrence is common where surgeons divide intestine near neoplasm, fearing they cannot join proximal and distal ends; (h) stitches often cut out under tension; (i) stenosis

at suture line is not infrequent; (*j*) posterior fecal fistula is a usual complication of rectal anastomosis; (*k*) peritonitis is common where leakage occurs above the peritoneal attachment; (*l*) sloughing often ensues from injury to vessels, mobilization or tension upon the gut, and (*m*) the procedure is contraindicated for cancer situated in the lower rectum.

In the author's opinion *resection* is preferable for *colonic* and *sigmoidal*, while *amputation* with or without *colostomy* is the operation of choice for malignant *anorectal* neoplasms.

Preparation of Patient.—This is of considerable importance, as it facilitates operation, minimizes infection, and lessens post-operative complications and discomfort, but with scrupulous care the rectum cannot be made absolutely aseptic. When feasible, except in acute obstruction, *five days* are necessary to properly prepare the sufferer for operation, three of which are spent in the hospital, but confinement to bed is not essential; this applies to all extirpations and resections unless acute obstruction makes immediate operation necessary.

Preliminary preparation consists in: (*a*) prescribing supportive measures, forced diet, and suitable medication; (*b*) encouraging the sufferer by manner and words; (*c*) employing mild saline laxatives or castor oil to cleanse the bowel when there is fecal impaction; (*d*) daily ichthyl 2, or boric acid 4 per cent. irrigations of colon and rectum to expel irritating discharges, feces, cleanse crater ulcers, and reduce inflammation of the mucosa; (*e*) administering sedatives and hypnotics to quiet nerves, overcome insomnia, and relieve pain, and (*f*) prescribing salol, beta-naphthol, bismuth subnitrate, or other intestinal antiseptic.

Hospital preparation must be carried out under direct supervision of the surgeon, for unless the bowel is thoroughly cleansed of discharge, feces, and scybala above and below the growth, serious postoperative complications are likely to follow.

Strong purgatives are objectionable since they increase suffering and frequently do not expel impacted feces; this can usually be accomplished satisfactorily with liberal doses of castor oil, repeated high soapsuds, ox-gall, or oil enemata and massage of the sigmoid flexure, to break up semisolid or hardened feces. When the strictureal opening is sufficiently large, expulsion of retained feces and discharge is greatly facilitated by breaking up the mass and flushing out *débris* through proctoscope or sigmoidoscope, but when occlusion is almost complete, dilatation is necessary to accomplish the above results, or the bowel must be irrigated frequently through a colon tube or catheter until freed of softened feces and discharge.

Sometimes *colostomy* is avoided by cureting or burning a channel through the eameorous mass with a cautery, unsafe procedures, since they may be followed by hemorrhage or rupture of the bowel and peritonitis. Forceful divulsion of the diseased bowel with fingers or bougies is contraindicated for the same reasons when the growth lies above the peritoneal attachment.

Preliminary colostomy is indicated when obstruction is complete or sufficient to prevent emptying the intestine of feces, as otherwise extirpation requires a longer time, the operation may have to be abandoned, or dangerous postoperative complications arise.

Establishment of an artificial anus a few days prior to excision undoubtedly makes operation easier, materially lessens danger of infection, and if *permanent*, when the distal end is detached and mobilized, prevents possible gangrene from the tension. Patients rarely object to *temporary*, but bitterly oppose *permanent* colostomy, owing to its disgusting features, hence the author does not perform the latter except where continuity of the bowel cannot be restored without risk of serious complications.

On the day preceding operation solid food is prohibited, a laxative is administered, the bowel is irrigated twice with a 5 per cent. ichthyol solution, following which intestinal peristalsis is arrested by an opiate.

On the morning of operation the bowel is washed out with 25 per cent. peroxid of hydrogen solution, the abdomen, labia, serotal, perianal, and sacral regions are shaved, washed with soap and water, dried, and protected by a sterile gauze dressing.

The patient is given a hypodermic of morphin, gr. $\frac{1}{4}$ (0.016), forty-five minutes before entering the operating room, and after being placed in a suitable posture upon the table and anesthetized, the anus, buttoeks, and adjacent parts, and abdomen later if necessary, are painted with surgical iodin; preparation is then completed by swabbing the rectum with hydrogen peroxid or iodin, and closing the anus with a purse-string suture tied tightly around a gauze plug (Fig. 634) when the lower rectum is to be excised.

Position.—Posture must be varied, depending on the operation to be performed. The author prefers the *elevated lithotomy* for *perineal* or *vaginal*, *exaggerated left Sims'* for *sacral*, and the *Trendelenburg* followed by the *lithotomy* posture in *abdominoperineal* excision.

Classification.—When the kidney, uterus, or colon is removed the operation is designated *nephrectomy*, *hysterectomy*, or *colectomy*, and when the rectum is extirpated the author terms the procedure *proctectomy* in preference to *excision*, employed by some authorities.

He also prefers the captions *inferior* and *superior* to *perineal* and *sacral proctectomy*, because in the former the diseased bowel is approached from *below*, while in the latter the gut is attacked from *above*.

With this understanding the author classifies operations employed in anorectal *extirpation* for cancer and other diseases as follows:

1. Inferior proctectomy—perineal excision.
2. Superior proctectomy—sacral excision.
3. Vaginal proctectomy.
4. Abdominoperineal—abdominosacral proctectomy.
5. Abdominal proctectomy.
6. Partial—local—proctectomy.
7. Anal proctectomy.
8. Two-stage—resection proctectomy.

Chapter LIV

Malignant Growths of the Rectosigmoidal Juncture, Rectum, and Anus (*Continued*)

SURGICAL TREATMENT—OPERABILITY, RECURRENCE, COMPLICATIONS, PROGNOSIS

Operability of Anorectal Cancer.—The author collected, tabulated, and analyzed the accompanying table of statistics concerning excision and resection of the rectum to ascertain the operability of malignant growths in this region:

STATISTICS COLLECTED BY THE AUTHOR SHOWING OPERABILITY OF ANORECTAL CANCER

	Per cent.		Per cent.
Heidelberg Clinic.....	71.1	Bergman Clinic.....	80
Zurich Clinic.....	50	Schede Clinic.....	78.7
<i>Different years:</i>			
Zurich Clinic.....	55.8	König Clinic.....	80
Göttingen Clinic.....	78.3	Kraske Clinic.....	73
Marburg Clinic.....	75.4	Mikulicz Clinic.....	60.6
Breslau Clinic.....	60.6	Helferich Clinic.....	47.5
Rostock Clinic.....	47.2	Witzel Clinic.....	20
Griefswald Clinic.....	48	Mayos (1910-13) Clinic.....	51
		Mayos (1913-15) Clinic.....	71
		Gant Clinic.....	65

Information thus gained is not very reliable, because: (a) descriptions were vague; (b) one surgeon carefully selects his, while another operates in nearly all cases; (c) it is not always stated whether growths were removed by extirpation or resection; (d) one authority publishes consecutive operations, while another does not; (e) one series includes a single type of operation and another the perineal, Kraske's, and combined procedures together; (f) some surgeons give immediate or hospital and others the remote mortality of extirpation; (g) operators employed different technic for the same type of operation; (h) some operated only when growths were movable, others, when extensive and fixed; (i) in some instances extirpation was early and in others late—after metastasis had occurred or the vagina, uterus, prostate, or sacrum were involved; (j) and in some cases operations were confined exclusively to low and others to anal and high growths. Hence the author will give only statistics of a few expert operators in this field of surgery.

Many anorectal cancer patients are incurable when they consult the proctologist or surgeon, having been previously treated

for another condition, mistakes which would not have occurred if a digital and proctoscopic examination had been made earlier.

Sufferers of this class seen early occasionally decline operation and later implore the surgeon to do something when the growth cannot successfully be removed. Results as to mortality, recurrence, and complications depend mainly on the care employed by the attendant in selecting his cases and technic of the operator.

The percentage of inoperable anorectal cancer is considerably higher than the profession is aware. Growths are usually removable within two to four months of their incipiency, but extirpation is fraught with considerable danger when they have been neglected from four to six months or longer.

Anorectal growths in the transitional stage and cancers involving the mucosa and deeper tunics, where the bowel is movable, are always extirpated, irrespective of size or location; but when neoplasms are immovable, involving perirectal structures or neighboring organs, and metastases are present in adjacent or remote lymph-nodes, liver, lung or spleen, extirpation is usually unjustifiable.

Some rectal cancers suitable for excision are rendered inoperable by the patient's exhausted condition or complicating disease—*infection, diabetes, pulmonary tuberculosis, arteriosclerosis, nephritis, anemia, or heart lesions.*

When it is questionable whether the neoplasm should be extirpated, the patient is given the benefit of the doubt and operated, for his life may be saved. Growths apparently inoperable may sometimes be rendered operable later by colostomy and irrigation, *x-rays, or radium treatment, which may diminish the inflammatory area, rendering the bowel movable.*

In 300 consecutive anorectal cancer patients treated by the author, 65 per cent. were diagnosed as operable.

The operability percentage of anorectal cancer varies yearly in accordance with types of cases examined.

Mortality from rectal extirpation has not materially decreased recently despite antiseptic methods and improved technic, because surgeons excise the rectum in cases formerly considered inoperable, do wider operations, removing all infected glands and sometimes involved parts of adjacent organs and mobilize the sigmoid, that the bowel may be brought down and sutured to the anus, with the object of preserving the sphincter when there is a reasonable chance of obtaining a cure.

Preliminary Colostomy.—While disgusting to patient, colostomy renders excision and resection less dangerous, enabling the

surgeon to do a cleaner operation, and eliminates sloughing that frequently follows suturing the gut in the sacral or anal region.

Women withstand extirpation better than men, because the peritoneum seems to have greater resistance, and the pelvis is wider, allowing easier dissection. The mortality of the combined operation in men is double that of women.

In the Mayo Clinic the mortality following extirpation of the rectum and lower sigmoid for cancer varied, being 17 per cent. for the years 1910–1913 and 12.5 per cent. from 1913–1916.

Mortality of Excision Operations.—The average mortality of rectal extirpation by the perineal, sacral, and combined routes up to and including 1899 is fairly well shown in the annexed table of Krönlein, which gives the results of prominent European operators, but in recent years, due largely to asepsis and improved technic, the mortality has been lessened considerably.

OPERATIVE MORTALITY IN RADICAL OPERATIONS AND EXCISIONS

Operators.	Year.	Operations.	Deaths.	Per cent.
Kocher.....	1873–1899	35	10	28.5
König.....	1878–1890	96	31	32.5
Czerny.....	1878–1891	109	11	10
Krönlein.....	1881–1899	63	7	11.1
Gussenbauer.....	1882–1896	145	33	22.7
Bergmann.....	1883–1888	46	5	11.3
Madelung and Garre.....	1883–1899	53	10	19
Kraske.....	1885–1896	80	15	18.7
Kuster.....	1885–1898	95	24	25.2
Hochenegg.....	1887–1897	93	8	8.6
Mickulicz.....	1890–1897	66	17	25.7
Total.....	.....	881	171	19.4

The following table—1578 collected cases—by Tuttle gives the average mortality for these procedures as 20.2 per cent., which is slightly higher than Krönlein's.

TUTTLE'S TABLE

Method.	Number of cases.	Deaths.	Mortality. Per cent.
Sacral.....	913	211	23.1
Perineal.....	569	76	13.5
Abdominal.....	49	18	36.7
Combined.....	22	9	40.9
Vaginal.....	23	3	14.3
Anal.....	2	2	100
Total.....	1578	319	20.2

Mortality of Perineal Excision.—Few statistics have been published giving the mortality of perineal excision. Statistics of Czerny, Kocher, Krönlein, König, Mikulicz, and Gussenbauer (217 cases) show an average mortality of 17, Hartmann's collected cases (18 clinics) 15.8, and Tuttle's collected cases (913) gave a mortality of 13.5 per cent.

Prior to advent of asepsis the mortality of perineal proctectomy was approximately 25 per cent., but with improved technic the death-rate has been reduced by more than one-half.

In the author's many cases of anorectal cancer extirpated by the perineal route during twenty years average mortality was approximately 7 per cent., which is higher than in a preceding series of cases on account of his accepting more difficult cases, and his greater experience in rectal extirpation.

Mortality of Vaginal Excision.—This procedure constantly grows in favor with the author, for by it one can with equal facility extirpate cancers of the upper, lower, and middle rectal segments. In 40 vaginal excisions performed by the author the mortality was 8 per cent. In 23 vaginal extirpations compiled by Tuttle there were 3 deaths, a mortality of 14.3 per cent.

Mortality of Sacral Excision—Kraske's Operation.—The author's mortality for *sacral excision* has varied, depending on the type of operation, having been 10 per cent. for Kraske's excision, and slightly less for the Rhen-Rydgier (bone-flap) procedure.

OPERABILITY AND MORTALITY OF KRASKE'S OPERATION—VOGEL'S MODIFICATION OF KRÖNLEIN'S STATISTICS

Operator.	Number of cases treated.	Number of cases operated on. Per cent.	Operative mortality. Per cent.
König.....	120	78.3	32.5
Czerny.....	151	71.1	10
Krönlein.....	110	57.2	11.1
Gussenbauer.....	259	56	22.7
Bergmann.....	155	80	32
Madelung and Garre.....	115	46	19
Kraske.....	110	78	18.7
Küster.....	126	75.4	25.2
Hochenegg.....	141	66	8.6
Mikulicz.....	109	60.6	25.7
Helferich.....	46	48	13.6
Schede.....	66	80.3	32

This table shows 1508 patients had rectal cancer, of whom 66.4 per cent. were operable, with an average mortality of 20.9

per cent. In 542 sacral operations tabulated by Prutz there were 115 deaths, a mortality of 21.1 per cent. Pilchler compiled 963 sacral excisions, with a mortality of 15 per cent., which statistics, when revised by Prutz, showed a mortality of 21 instead of 15 per cent. Hartmann gives the average mortality of French, English, and American surgeons as 15 per cent., and Tuttle (913 collected cases) found the mortality for the sacral operation 23.33 per cent., though his personal statistics (173 cases) gave only 18.3 per cent.

Mortality of Abdominoperineal and Abdominosacral Excision—Combined Operation.—McArthur gives the mortality of abdominoperineal excision as 35 per cent., and when preceded by colostomy, 13 per cent.; the Mayos performed 19 combined operations with permanent colostomy, with a mortality of 26.3 per cent.; Tuttle tabulated 22 combined excisions, with a mortality of 40.9 per cent., and in Rotter's 25 cases the mortality was 44 per cent.; Kraske's 10 cases, 40 per cent., and Kummell's 14 cases, 43 per cent.

The author has performed abdominoperineal and abdominosacral extirpation 24 times in recent years, with a mortality of 20 per cent. without performing colostomy. In his earlier cases the mortality was considerably higher.

Abdominal Excision.—Occasionally it is advisable to excise cancers at the *rectosigmoidal* juncture or a little higher, through the abdomen, but the operation is difficult, owing to lack of room and absence of a peritoneal covering over the rectal end. The author's mortality for rectosigmoidal extirpation is 20 per cent.

In 5 recent colonic resections performed by the author there was only one death, but the average mortality of his colectomies, taken as a whole, is 15 per cent.

Mortality of Anal and Partial Excision.—The author has excised 10 anal epitheliomata without mortality, but the disease, which appeared in the form of an ulceration or wart-like excrescence, was not extensive.

Three times the author has removed small low-lying rectal cancers by *partial* or *local* excision without mortality, but came near losing one patient through perirectal infection.

In 450 radical anorectal operations performed by the author the mortality percentage for the different types of extirpation and resection was in round numbers, as shown in the accompanying table.

Based upon 350 personal cancer operations involving the colon, sigmoid flexure, rectum, and anus, and a study of recent statistics concerning them, published by experienced surgeons, the author estimates that the immediate mortality following

colonic and rectal extirpations for cancer by different procedures is approximately as follows:

	Per cent.
Colectomy (including sigmoidectomy).....	15
Abdominoperineal excision—combined operation (without colostomy) ..	20
Sacral excision—Kraske's operation.....	10
Vaginal excision	8
Perineal excision—Lefranc's operation	7

In the author's cases of rectal extirpation, usually perineal or vaginal, preceded by permanent colostomy the mortality percentage was considerably below that indicated in the table.

The mortality of *anal excision* for epithelioma and *partial excision* for early rectal carcinoma is practically *nil*.

The mortality from these operations is considerably higher when performed by inexperienced surgeons or those who do not carefully select their cases for excision. Mortality statistics for rectal and colonic extirpations was considerably higher prior to the advent of asepsis, marked improvement made in the technic of these procedures, and the practice of performing preliminary colostomy.

Prognosis.—The prognosis is grave in the majority of rectal carcinomata and sarcomata because growths are inoperable in most instances when they pass from the hands of the family physician to the proctologist.

A fair percentage of rectal cancer patients live for five years or permanently recover following early extirpation, and occasionally sarcomata respond to the Coley treatment.

Recurrence.—The rather high percentage of recurrence following rectal extirpation would be considerably less if anorectal cancers were diagnosed and operated earlier. The younger the patient, the more frequent and rapid is recurrence; return of the growth is said to occur more frequently following perineal and sacral than after combined excision, in which glands are more widely removed.

Permanent results depend largely on the care used in selecting cases and completeness of operation, for recurrence is certain unless every vestige of growth with infected glands is removed. Recurrence usually occurs at site of original neoplasm in neighboring or remote lymph-nodes, liver, lungs, spleen or other organ, or operative scar tissue, but cancer rarely reappears in the mucosa or gut elsewhere.

There is greater proclivity to recurrence from anal canal and growths located on the anterior surface of the rectum than elsewhere. Patients surviving rectal extirpation for malignant disease

three or more years without recurrence are usually classed as cured. Return of disease is frequent within three or four months, less frequent during the first, unusual during the second, and rare in the third or later years. The majority of patients operated are over fifty years of age and *frequently die of other disease*; or are difficult to trace following extirpation that a history of their case may be subsequently kept.

Of the author's cancer patients now living following rectal extirpation 1 was operated eighteen years ago; 1 sixteen; 2 thirteen; 1 twelve; 2 ten; 1 nine; 3 eight; 4 seven; 8 six, and *quite a number* are still well at the end of from three to five years; but the majority died within the first year.

The percentage of cures following the author's rectal extirpations for cancer in recent years is approximately 26 per cent., which is based upon operability of 65 per cent. and not on all cases seen.

The percentage of cures in 46 collected cases by Hartwell was 16, Tuttle 32 cases, 21.8 per cent.; Mayos 364 cases, 33 lived three years, 28.3 per cent. lived five years.

Cures of European surgeons vary from 9.8 to 40 per cent., but the average of leading operators shown in the accompanying table is 16 per cent., being the same as the author's.

CURES

Operator.	Permanent results. Per cent.
Kocher.....	38.5
Von Bergmann.....	17.4
Kuster.....	16.8
Krölein.....	16
Czerny.....	14.6
Kraske.....	13.7
Hochenegg.....	12.9
Madelung and Garre.....	11.3
Mikulicz.....	9.7
Schede.....	16.7
Average percentage of cures.....	16.7

Complications and sequelæ accompanying and following rectal excision and resection may be *operative*, *postoperative*, or *remote*.

Operative.—Soiling of the operative field with feces is serious because it delays the surgeon and invites perirectal if not peritoneal infection that terminates in abscess and fistula, prolonged convalescence, or death. *Hemorrhage* is profuse particularly in perineal excision, but easily controlled by hot compresses for oozing, or by

ligating spurting vessels. The author has never lost a patient from bleeding during or following rectal extirpation.

Injury to adjacent organs—ureter, bladder, prostate, seminal vesicles, urethra, or vagina—is occasional during extirpation of low-lying cancer, but occurs less often in women than men, and in the hands of experts than inexperienced operators.

Anesthesia if prolonged or poorly administered may delay the operation or cause death, either immediate or remote. In Miles' cases (23) operated under ether and chloroform the mortality was 26.7 per cent., but in a more recent series (23 cases) operated under *gas oxygen* preceded by *spinal anesthesia* the mortality was only 9.6 per cent., the difference being due to lowered blood-pressure and shock induced by the former. Combined *gas oxygen* and *spinal* is the anesthesia of choice in this class of patients among English surgeons.

Postoperative.—*Shock* is slight or moderate from perineal and sacral, and profound following combined excision of the rectum; it is lessened by hypodermoclysis or infusion given during or after operation.

Pain may be troublesome, but not so severe as one would expect from such an extensive operation, and after the third day suffering is slight except during and following stool.

Hemorrhage is believed to be a frequent and serious complication, but the author has experienced only one serious secondary hemorrhage in hundreds of excisions, and in this instance bleeding was quickly controlled by cutting stitches, exposing, and ligating spurting vessels.

Vesical and kidney disturbances are common complications of perineal, sacral, and abdominoperineal extirpation, but are more frequent following the latter through shock to the hypogastric plexus.

Vesical pain is an occasional annoyance and difficult micturition a common complaint, owing to pressure on the urethra caused by packing introduced to control bleeding. *Suppression of urine*, next to *sepsis*, has been the most common cause of death following anorectal excision in the author's practice, and occurred subsequent to high rectal and sigmoidal operations or in patients suffering from chronic nephritis where urinary secretion was arrested by shock and anesthesia.

Rectovesical and *recto-urethral* fistula are occasionally observed after extirpation when bladder or urethra have been injured during or sloughed subsequent to operation.

Infection is the most frequent and serious complication of

anorectal extirpation; probably more than 50 per cent. of deaths are due to peritonitis, perirectal abscess, or exhausting purulent discharge from septic wounds.

Gangrene of the rectum, a common and formidable complication of rectal excision, ensues when vessels supplying the gut are ligated, put on the stretch when anchoring the bowel to the anus, and when the nutrient artery is angulated by the *sacral promontory*; also sloughing may result from sepsis, but this occurs later than gangrene from impaired blood-supply which is in evidence within thirty-six hours. Osteo-integumentary flaps following sacral excision occasionally become gangrenous and slough off, leaving an ugly wound.

Necrotic tissue from any cause is immediately removed, a procedure that does not always save life.

Pneumonia, embolus, acidosis, acute Bright's disease, and urosepsis are occasional complications of anorectal excision and resection.

Excoriation of perianal skin by mucus and pus is annoying, but discomfort from this source is mitigated by bathing, drying, and smearing the integument with zinc oxid or calomel ointment.

Remote Complications or Sequelæ.—*Incontinence of feces* may be an early, late, or permanent sequel of excision, and is particularly annoying to the patient.

Fecal control may obtain following rectal excision where the sphincter muscle has been left, or the patient may suffer from partial or complete *incontinence* the result of injury to nerves presiding over the sphincter, though the anus remains normal in appearance.

No attempts are made to save the anal muscle except in selected cases because: (a) the sphincter is involved; (b) the growth is low lying, prohibiting the removal of sufficient gut and infected glands; (c) nerves supplying the anal muscle are destroyed, and (d) the surgeon is prone to sacrifice *safety* in attempting to prevent incontinence.

When the sphincter has been removed, fecal incontinence is minimized by: (1) coarse diet and astringent medication; (2) snugly suturing the levator ani about the rectum; (3) twisting the gut before anchoring it; (4) stitching the split gluteus maximus about the bowel, and (5) procuring a narrow rigid tube lined with mucosa without attempting to attach the retracted rectum to the skin.

Fecal incontinence is *partial* where there is control over solid, and *complete* when the patient is unable to retain either formed or fluid feces.

Following 200 rectal extirpations by the author relative to fecal incontinence results were as follows:

	Per cent.
Continen ^c e	25
Partial incontinence.....	65
Complete incontinence.....	10

Fecal incontinence occurs less frequently when the levator ani muscle is snugly sutured about the rectum (Fig. 639) and after Hochegger's "pull through" method than resection.

Stricture following excision where the sphincter has been removed is beneficial because it enables the patient to retain solid feces; with this idea in view the author endeavors to secure a rigid tube lined with mucosa by not attempting to suture outer gut tunics to the anus. When stenosis is almost complete and responsible for straining and frequent incomplete evacuations, its caliber is increased by forcible divulsion or posterior proctectomy.

Procidentia recti—slight or extensive (Figs. 622, 623)—is an occasional complication of extirpation due to severing the mesorectum or lessening pelvis support through excising part of the sacrum or removing the sphincter. *Prolapse of mucosa* only is relieved by infiltrating it with eucain, ligating, and removing it in segments; and true rectal procidentia is corrected by the operations described elsewhere, which are preferable to excision of the extruded gut, a procedure that must be repeated.

Abnormal anus is a common complication of rectal amputation and resection, the opening being established at the coccygeal tip, sacral region, vaginal wall, or inguinal region when the gut cannot be brought down and sutured to the perianal skin. Patients object strenuously to inguinal colostomy, though it is often preferable because the anus is made nearly if not continent, and tension and consequent sloughing of the bowel is avoided.

Fecal fistula in the posterior median line is a common complication of resection because union seldom obtains, since the rectal stump is devoid of peritoneum.

Recto-urethral fistula is also an occasional complication of anorectal extirpation. In a case of the author's the urethra was accidentally severed, but no permanent harm resulted, as primary union promptly followed anastomosis of urethra ends about a sound, for which a drainage catheter was substituted at conclusion of operation. The author has several times been called upon to repair urethral injuries made by others when performing perineal or Kraske's excision.

Rectovesical fistula resulting from rectal extirpation has been twice observed by the author.

Removal of sections of the prostate accidental or on purpose occasionally complicates anorectal excision for cancer; the author was called in consultation to see a man in whom the entire prostate and lengthy segment of the urethra had been removed by an inexperienced surgeon who mistook the prostate for a carcinomatous nodule.

The vaginal wall is sometimes *buttonholed* or a part of the rectovaginal septum is excised during rectal extirpation, but generally the injury is easily repaired. The ureter has been severed or torn in two by operators while performing *inferior-superior* or *abdominoperineal* proctectomy.

In a case of the author's the accidentally severed proximal end of the ureter was temporarily transplanted into the rectum, and later anastomosed with the distal end.

Chapter LV

Malignant Growths of the Rectosigmoidal Juncture, Rectum, and Anus (*Continued*)

AMPUTATION, RESECTION—METHODS OF DEALING WITH BLOOD-VESSELS AND LYMPHATICS

Method of Dealing with Blood-vessels.—Handling blood-vessels and associated lymphatics constitutes the most important step in colonic, sigmoidal, or rectal extirpation for malignancy, because when arteries and associated lymphatics are intelligently handled extensive gut segments are easily mobilized, blood- and lymph-vessels, glands, and fat in which they lie receiving *direct* or *indirect* drainage from the growth through anastomosis are removed, hemorrhage is controlled preceding or during operation by dealing with vessels in sight and sloughing of the bowel from tension made on important arteries, when gut ends are sutured or the proximal gut is attached to the skin, is avoided.

Inexperienced surgeons have great difficulty in freeing the bowel and bringing it down to the anus or for anastomosis with the distal end and controlling hemorrhage during operation, and their patients frequently die from shock or sloughing of gut following extirpation, because they are not familiar with the location and methods of dealing with arteries concerned in the operation. The expert surgeon avoids these troubles, because early in the operation he *isolates, ligates, and divides necessary vessels*, which enables him to perform a quicker, cleaner, and more complete operation and obtain better immediate and permanent results with less danger to the patient through the elimination of infected lymph-nodes and vessels.

The principal advantages of isolating, ligating, and severing blood-vessels going to the malignant bowel are: (a) It permits free mobilization of the gut so that it can be brought down the necessary distance; (b) makes easy the removal of lymph-vessels, glands, and fat in which they lie; (c) insures nutrition to the bowel by allowing vessels to be divided in plain view above the termination of the anastomotic loops, thereby avoiding the possibility of sloughing and fecal fistula, and (d) it secures for the operator a

clean field, enabling him to work quickly and satisfactorily with less shock than when arterics are not tied as a preliminary measure.

The practice of ignoring arteries and freeing or tearing the gut loose with attached vessels by rough blunt dissection rather than by clean cuts is no longer condoned, since it causes unnecessary trauma, is accompanied by excessive bleeding, which delays the operation, and is frequently followed by gangrene of the gut or secondary hemorrhage.

It is essential for the operator to familiarize himself with the distribution of both vascular and lymphatic systems from cecum to the anus, that he may amputate or resect the rectum or sigmoid flexure in the shortest possible time, avoid primary and secondary hemorrhage, shock, fecal fistula from impaired nutrition, and by a wide operation prevent early recurrence. A comparison of the statistics of experienced surgeons who deal with vessels by sight in a rational manner show the advisability of this procedure.

It is necessary to know the derivation, location, and size of main arterics and their branches supplying the colon, sigmoid flexure, and rectum, and anastomotic arrangement by means of which they are connected with arterics higher up, since without this understanding the surgeon cannot protect himself from annoyance and delay induced by oozing or copious bleeding, intelligently preserve nutrition in gut ends, nor determine the extent to which lymphatic vessels and glands should be removed, since they receive drainage coming *directly* from the growth and *indirectly* through anastomotic loops (Fig. 660).

No fixed rule can be laid down for ligating vessels in resection and amputation of the colon, sigmoid flexure, or rectum because the location and size of the growth and extent of lymphatic involvement are never the same in cases of intestinal cancer. In one ligation of local arterics suffice, while in another it may be necessary to tie several vessels, including those at the site of operation and one or more main trunks connected directly or indirectly by anastomosis with the diseased segment of gut being removed. No more vessels are tied than is obligatory with thorough work, and ligatures are placed as low down as is feasible to preserve nutrition. While it is well to be conservative, it is unwise to be overcareful and attempt to save gut having a poor circulation which would later slough and cause death from peritonitis, infection, or terminate in a fecal fistula. Timid surgeons subject patients to these dangers and early or late recurrence because in their efforts to preserve an additional inch of bowel they divide the intestine near the growth,

leaving involved or lymphatic vessels, glands, and bed of fat in close proximity to or distant to the neoplasm.

The author has repeatedly removed large segments of or all the colon, sigmoid flexure, or rectum by cecectomy, colectomy, sigmoidectomy, or proctectomy, and his observations have convinced him that removal of a few inches more or less of the large bowel does not materially increase danger of the operation, interfere with nutrition, delay convalescence, or cause additional suffering, and when there is doubt as to how much bowel ought to be removed he excises an extra length to be on the safe side.

By means of digital, proctoscopic, and sigmoidoscopic examination and palpation malignant neoplasms involving the lower rectum are accurately located, defined, and vessels to be ligated usually determined, but when the growth involves the rectosigmoidal juncture or sigmoid flexure one cannot always decide before operation which arteries will require ligating because of the wide distribution of blood and lymphatic vessels that may be directly or indirectly involved by cancer attacking these segments of intestine.

The colon and sigmoid flexure have a *direct* and *indirect* blood-supply, sigmoid arteries from the *inferior mesenteric* constitute the *former*, and the *latter* consist of a main vessel connecting anastomotic loops of the transverse descending colons and sigmoid flexure with each other, to provide nutrition in these gut segments when their direct blood-supply is absent or been destroyed by operation or injury. This arrangement of the large intestine is of great assistance in rectocolonic extirpation and resection. Connecting arcades are located 1 or 2 inches (2.54 or 5.08 cm.) from and send distributing branches to the bowel, a fortunate anastomotic arrangement between different colonic segments that make it possible in colectomy and sigmoidectomy to ligate the *superior hemorrhoidal*, *sigmoid* and *left colic arteries*, singly or collectively, and still preserve nutrition of the descending colon and sigmoid flexure, *providing ligatures are placed on trunks of the vessels proximal to anastomotic loops, 2 inches (5.08 cm.) from the bowel*, owing to the fact that they receive sufficient blood through the anastomotic loops of the middle colic artery (Fig. 660).

The blood-supply of the *upper rectum* differs from that of the sigmoid flexure in that it is derived directly from the superior hemorrhoidal artery, has no connecting arcades, and is devoid of nourishment except an arterial twig from the lower sigmoid artery.

This segment of the rectum depending almost solely on the superior hemorrhoidal artery is termed the *danger zone* (see plate), because when the rectum is amputated or resected within this

area the proximal gut end lacks nutrition and usually sloughs. Consequently, when the rectum above the part supplied by the middle hemorrhoidal artery is to be removed, following ligation of the superior hemorrhoidal artery, it is advisable to go high up and excise a liberal segment of bowel by dividing the lower end of the sigmoid just above the termination of the anastomotic loops (Fig. 660). Having ligated the superior hemorrhoidal and the lowermost sigmoid artery, the poorly nourished part—*danger zone* of the rectum—is excised and continuity of the bowel restored by anastomosis or the proximal end is sutured to the anus with assurance that its blood-supply has been preserved.

Many fecal fistulæ and deaths have followed rectal extirpation where the superior hemorrhoidal artery was ligated and the rectum divided in the danger zone and the unnourished proximal end of the bowel was sutured to the distal gut end or skin in the anal, coccygeal, or sacral region.

Large vessels are ligated not so much for the purpose of controlling hemorrhage during the operation, as to enable the operator to mobilize the gut and remove infected glands, lymph-, and associated vessels.

The *inferior mesentery* artery (Fig. 660) and its continuation, the superior hemorrhoidal (Fig. 598), pass in a straight line from its origin at the aorta to its termination on the posterior surface of the upper rectum. Consequently, it is often impossible to mobilize or safely isolate the rectum or lower sigmoid and bring it down sufficiently for anastomosis with the anal segment or attachment to the perianal skin in the removal of cancer involving the rectum or lower sigmoid flexure unless this vessel or the sigmoidal and superior hemorrhoidal arteries have been tied and divided.

Occasionally the artery is sufficiently long to allow the bowel to be brought down without being severed, but when it is not and the gut is freed by rough dissection and dragged downward without previous ligation and division the superior hemorrhoidal artery is sometimes torn in two or narrowed by tension or compression exerted by the sacral promontory (Fig. 597) when the gut is anastomosed or sutured to the skin, and as a result blood-supply to the proximal gut end is destroyed and sloughing ensues.

Unless vessels in the terminal bowel receive sufficient blood and *spurt* when clamps or ligatures are removed, circulation has been impaired and an additional segment of gut must be removed to prevent subsequent sloughing of the proximal end of the bowel.

After peritoneum at the outer side of the descending colon and sigmoid has been incised (Fig. 985) the exposed inferior mesen-

teric or its continuation, superior hemorrhoidal artery, is ligated and divided, which permits the operator to mobilize and straighten out the sigmoid flexure so that it can easily be brought down the necessary distance and anastomosed with the distal stump or sutured to the perianal skin.

Usually ligation and severing the superior hemorrhoidal and lowermost sigmoid arteries is sufficient, but occasionally extensive mobilization of colonic segments is required that all lymphatic



Fig. 597.—Manner in which gut is compressed against the sacral promontory at *A* when too much tension is made on the bowel by attaching it to the anal skin, a condition often followed by sloughing of rectum or sigmoid.

vessels and nodes directly or indirectly associated with the cancerous bowel may be removed, which may necessitate tying and dividing of the left colic and inferior mesenteric arteries (Fig. 660).

Under such circumstances circulation of the descending colon and sigmoid flexure is impaired, but not sufficiently so to interfere with nutrition because these colonic segments still receive blood from the middle colic artery through the anastomotic loops already mentioned (Fig. 660).

Many fecal fistulae and deaths have followed rectal extirpa-

tion where the superior hemorrhoidal artery was divided in the danger zone and the unnourished proximal was sutured to the distal gut end or attached to skin of the anal, coccygeal, or sacral region.

Large vessels are ligated not so much for the purpose of controlling hemorrhage as to enable the operator to mobilize the gut and clean out all infected glands and lymphatic vessels associated with them (Fig. 642).

Operations performed by Kummell, DeInervain, Treves, Mayo, Moynihan, Tuttle, and the author have demonstrated that the sigmoid flexure, descending colon, or left half of the transverse colon may be extirpated singly or together and the proximal joined to the distal end or brought down to form a normal or sacral anus without impairing nutrition of the bowel by splitting the peritoneal covering, ligating, and severing the inferior mesenteric artery at its origin or lower down (Fig. 642), which facilitates mobilization of colonic segments without impairing their blood-supply owing to connection of anastomotic arches in the left half of the large intestine with the middle colic artery.

Archibald demonstrated that solutions injected into the middle colic artery reach all anastomotic loops from the left half of the colon to the termination of the sigmoid flexure, and holds that nutrition is preserved in these colonic segments even though the inferior mesenteric is ligated proximal to its branches—thus experimentally corroborating the claims of surgeons experienced in colectomy operations.

Advantages of the combined over perineal and sacral proctectomy are that the bowel can be mobilized and blood-vessels inspected and the gut divided sufficiently high, knowing nutrition of the gut is provided for, while in perineal and sacral extirpation the bowel is sometimes severed in the danger zone (Fig. 642), since the surgeon cannot always deal with vessels by sight or draw the bowel down sufficiently to divide it a point above the lowermost anastomotic loops.

It may be necessary to doubly incise the peritoneum in mobilizing the gut, isolating, ligating, and dividing vessels, but usually these objects are quickly accomplished by splitting the peritoneal reflection on the outer side (Fig. 985), deflecting the bowel inward, and wiping vessels free from the fat and peritoneum with gauze. When this has been done arteries come into view and are recognized by their tube-like feel and pulsating character, which enables the operator to identify individual vessels to be ligated.

It is occasionally advisable to carry the peritoneal incision above the sigmoid because the surgeon can then if necessary ligate

singly or collectively the superior hemorrhoidal, sigmoid, and inferior mesenteric arteries, mobilize the bowel, and remove associated lymph-glands, vessels, and bed of fat in which they lie together with infected nodes located at the iliac bifurcation.

If there is reason for suspecting the cancerous process has extended to the large gland—Moynihan's—located at the origin of the inferior mesenteric artery (Fig. 360), peritoneum is divided sufficiently high to permit the mobilization of the descending colon, splenic flexure, and if necessary left half of the transverse colon that the proximal end with its anastomotic blood-supply may be brought down and sutured to the distal stump or anal skin after the inferior mesenteric has been ligated close to the aorta.

Copious bleeding during rectal extirpation coming from the superior hemorrhoidal artery or its branches is prevented by ligating this vessel or the inferior mesenteric artery preliminary to or during operation.

The superior hemorrhoidal must always be divided between ligatures, otherwise through its anastomotic arrangement with other arteries of the middle and lower rectum dangerous bleeding may ensue; Hartman reports one death from hemorrhage following ligation of the proximal end only, and the author knows of a similar case where the operation was performed by a colleague.

The author has never encountered dangerous bleeding from the middle, inferior hemorrhoidal, or other vessels coming from the internal iliac arteries during proctectomy operations, consequently he seldom ligates the internal iliac, hypogastric vessels, or their branches, as recommended by Giordano, the Mayos, and others for the purpose of inducing complete hemoptosis. Bleeding from superior hemorrhoidal branches sometimes copious is quickly controlled by packing hot-water gauze compresses tightly about the isolated while the other side of the rectum is being freed from its attachments.

Occasionally the middle sacral artery is ligated and divided because of its tendency to contract, preventing clamping and ligation when the rectum is removed by the parasacral route. This vessel is easily identified and tied near its origin from the aorta when the abdomen is opened, but frequently it is difficult or impossible to isolate, tie, and divide when the rectum is being extirpated by perineal, sacral, or vaginal excision.

In closing his remarks on methods of dealing with blood-vessels in rectal, sigmoidal, and colonic extirpation the author advises a wide operation including free mobilization of the gut, severing of restraining arteries, and complete extirpation of lymph- and blood-

vessels, infected glands, and surrounding bed of fat, which means removal of all blood- and lymph-vessels receiving *direct* drainage from the growth or *indirectly* through anastomotic loops.

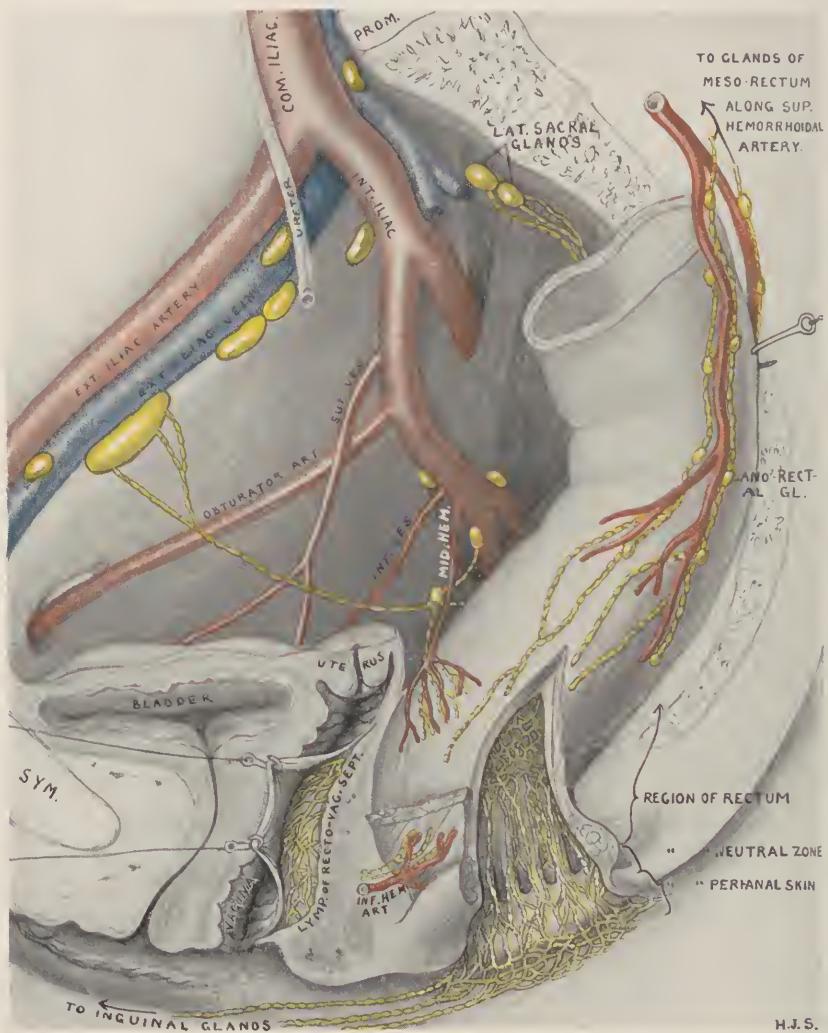


Fig. 598.—Arteries, veins, lymph-vessels, and nodes concerned in anorectal amputation and resection—proctectomy.

Surgical Importance of and Methods of Dealing with Lymphatics.—Infected lymph-vessels and glands with their beds of fat must be removed, for 50 per cent. of recurrences are traceable to lymphatic involvement caused primarily by direct or indirect

drainage—through anastomotic loops—(Fig. 660) from the neoplasm. Frequently enlarged glands are simply inflamed, but safety demands their removal, as they may be malignant.

Malignancy of the *anus* and *adjacent skin* is accompanied by infection of inguinal groups (Fig. 598) and cancer of the rectum above Hilton's white line by involvement of the anorectal (Fig. 598) and prevertebral (Fig. 598) lymph-nodes; when the anal mucosa is attacked *both sets of glands* may undergo malignant change, since lymph-vessels drain in *either direction* (Fig. 597). Hence *inguinal glands* are removed in cases of perianal epithelioma, *prevertebral lymph-nodes* when the rectum is involved, and both groups of glands are extirpated when the growth involves the *lower third* of the anal canal where drainage takes place in either direction.

When both rectal mucosa and musculature are malignant, lymphatic extension may follow branches of the superior hemorrhoidal artery to the anorectal and prevertebral lymph-nodes, the internal iliac vessels to a large gland situated beside the middle hemorrhoidal or to nodes connected with lateral sacral arteries which makes *wide dissection* imperative, particularly when glands associated with tributaries of the iliac vessels are involved.

In early excision—perineal, sacral, or vaginal—extirpation of *anorectal* (Fig. 598) and *prevertebral glands* (Fig. 597) is sufficient; but when growths are long standing and accompanied by malignant degeneration of lymph-nodes associated with vessels above the pelvic brim, the *combined operation* is indicated that these glands and lymph-vessels and surrounding fat may be completely removed; Moynihan makes a practice of excising a large node near the origin of the inferior mesenteric artery (Fig. 660).

Chapter LVI

Malignant Growths of the Rectosigmoidal Juncture, Rectum, and Anus (*Continued*)

AMPUTATION, RESECTION—METHODS OF DEALING WITH BOWEL ENDS, POSTOPERATIVE TREATMENT

Methods of Dealing with Bowel Ends in Sigmoidal and Rectal Extirpation.—Disposition of gut ends following rectal amputation and resection requires careful consideration to bring the operation to successful conclusion, obtain a cure, and avoid fecal incontinence.

There are several ways of disposing of gut ends, but none is effective in all cases. When endeavoring to decide what disposition to make of them it is necessary first to ascertain the location and size of the neoplasm, and whether or not adhesions, arteries, or a short mesocolon interferes with mobilization, which is frequently impossible previous to operation. The operator should also bear in mind that it is important to (a) avoid undue tension on the bowel, (b) preserve the blood-supply, (c) conserve as much of the intestine as is possible, (d) retain sphincteric control if feasible, (e) when the sphincter is sacrificed, to anchor the proximal gut at the most convenient site in a manner that gives the best control over movements, and (f) to take means to forestall procidentia.

For convenience of study the author has discussed the subject under the following headings:

1. Method of dealing with bowel ends when colostomy is performed.
2. Method of dealing with bowel ends when the sphincter is sacrificed.
3. Method of dealing with bowel ends when the sphincter is preserved.

Some surgeons always establish an artificial anus prior to or during rectal extirpation. Preliminary colostomy is resorted to less often than formerly because patients are more carefully prepared and danger from infection is less. The author resorts to colostomy when it is necessary to free the bowel of impacted feces unable to pass the obstruction, when the growth is inoperable, and when excision is performed in two stages—Mikulicz's operation.

Method of Dealing with Bowel Ends when Colostomy is Performed.—When an artificial anus is made, before or during



Fig. 599.—Sigmoid sutured in the abdominal wound forming an artificial anus, following which the rectum is extirpated by the perineal, sacral, vaginal, or combined routes.

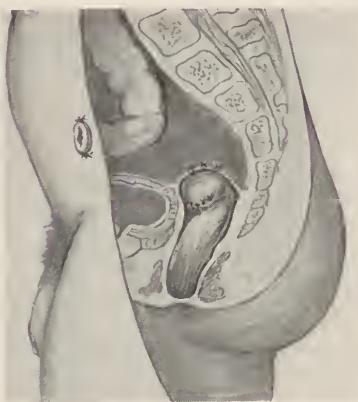


Fig. 600.—Proximal end of sigmoid sutured in abdominal incision and the distal closed, pushed downward, and peritoneum closed over it, the rectal segment being removed by the perineal or vaginal route at the same or second operation.

extirpation, ends of the intestine are dealt with as follows, depending on the technic of the operator and exigencies of the case:



Fig. 601.—Following the formation of an artificial anus, division of the bowel, and closure of the lower leg of colostomy gut, the sigmoid or rectum is extirpated by perineal, sacral, or vaginal proctectomy.

1. The gut is divided and proximal end sutured to the abdominal skin and the operation completed by excising the distal segment and growth (Fig. 599).

2. Proximal gut is sutured to the abdominal skin and the distal end inverted, closed, returned to the abdomen to be subsequently removed with neoplasm when condition of the patient has sufficiently improved (Fig. 600).

3. Subsequent to formation of an artificial anus the neoplasm and rectum are excised and the stump left attached to the lower colostomy opening closed at its distal end (Keen).

4. When long, the segment of gut attached to the lower colostomy opening is sutured to the anus following extirpation of the growth.

5. When this segment is short and removal is impractical, it is anchored in the sacrococcygeal region, forming a sacral or coccygeal anus, or the stump is closed and buried.

6. When the growth is high and the sigmoid long, the tumor is brought outside the abdomen, excised, forming a temporary or permanent artificial anus or continuity of the gut re-established by anastomosis, and the abdomen closed.

7. Under similar conditions lateral anastomosis is made with a Murphy button, McGraw elastic ligature, or sutures previous to fixation of gut in the skin; when the tumor is removed later, ends of the intestine are infolded with sutures and the skin closed over them without entering the peritoneal cavity, thereby eliminating the artificial anus with little danger to the patient.

8. In Kraske's operation, when urgent the tumor is withdrawn through the wound, excised, and a sacral anus formed which is left permanently or closed subsequently by anastomosis or invaginating the proximal through the distal segment of gut denuded of its mucosa (Fig. 628).

Some surgeons establish an artificial anus in every case of resection, believing the proximal end is not likely to become involved in the malignant process should there be recurrence, and that a more complete operation is performed when the diseased segment of gut with its blood-vessels, lymphatics, and fat is entirely removed. This procedure, while safer, is objectionable because patients resent an opening in the side, the sphincters are sacrificed, and a large dead space is left to cause trouble even when the peritoneal cavity has been closed.

On different occasions the author has resorted to colostomy and excision where cancer was extensive, anastomosis impracticable, or the proximal gut could not be sutured inside the healthy sphincter.

When the sphincter must be sacrificed he forms an abdominal anus after his technic (Fig. 1031), which gives the patient greater control over movements than when the anus is located in the

sacral, coccygeal, or interischial region. There is no occasion for leaving a blind end below the colostomy opening as suggested by Keen, because the distal segment can be removed, or when it cannot it is seized and drawn out through the artificial anus with forceps introduced for the purpose and amputated with little difficulty.

When a blind gut is left the patient may suffer from distention pains, owing to the collection of mucus.



Fig. 602.—The gut after being twisted (Gersuny) is sutured in the original wound or author's buttonhole slit (Fig. 606), which minimizes fecal incontinence.

Two-stage Operation.—In 2 cases of malignant obstruction involving the sigmoid flexure the author anchored the cancerous bowel to the skin and amputated it a few hours later when adhesions had formed between it and parietes. In another case where lateral anastomosis had been made prior to suturing sigmoid in the skin gut ends were subsequently infolded, closed, and buried beneath the skin following excision of the tumor; thereafter feces passed through the anastomotic opening with ease following removal of the growth. In this case owing to inflamed and ulcerated

state of the mucosa caused by prolonged obstruction and fecal impaction the bowel was treated with topical applications and medicated irrigations for several weeks before the artificial anus was closed by end-to-end anastomosis.

Preparatory to excision the author draws the bowel downward from above until taut, thereby leaving an excess of gut in the pelvis below the colostomy opening. This prevents prolapsing of the proximal end through the artificial anus and leaves sufficient intestine below to enable him to excise the growth by perineal, vaginal, or sacral proctectomy and attach the gut to the anus,

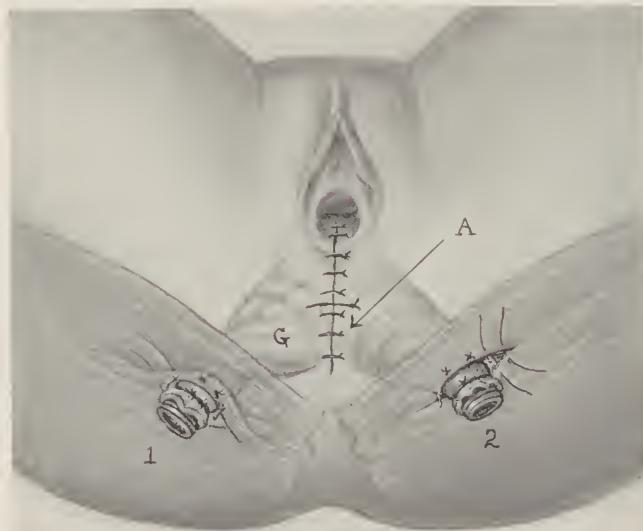


Fig. 603.—Following proctectomy the gut (A) may be brought through 2, the gluteus maximus or fibers of the muscle 1 arranged in figure-of-8 fashion, and sutured to the skin, with or without G being twisted.

following which the colostomy opening is left permanently or closed.

When *preliminarily* performing *colostomy* in cases where the anus is to be permanent the author divides the gut, attaches proximal end to the skin, closes the distal, and drops it through the peritoneum into the pelvis. This procedure saves time and minimizes danger of peritonitis when the lower bowel is subsequently extirpated. Usually when permanent colostomy is indicated the author excises the growth at the same operation by severing the gut and attaching the proximal end to the abdominal skin and extirpating the distal segment and neoplasm by perineal or vaginal proctectomy.

Method of Dealing with the Bowel Ends When the Sphincter is Sacrificed.—Several methods have been suggested for preventing or minimizing incontinence following excision of the lower rectum and sphincter, but thus far none has proved entirely satisfactory in all cases.

Witzel on Willem's suggestion brought the proximal end of bowel through a slit in the *gluteus maximus* (Fig. 603) and sutured it to the skin (Fig. 603). Rudgier drew the bowel down through both the *pyriformis* and *gluteus maximus* muscles.

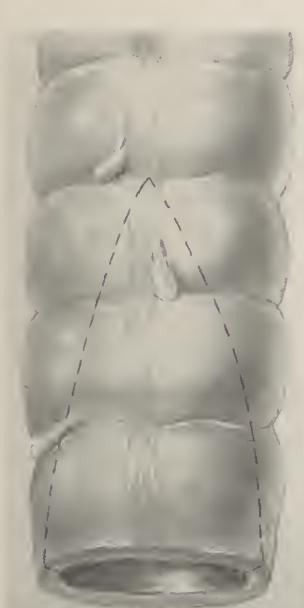


Fig. 604.—Author's method of lessening or preventing incontinence following proctectomy. End of the bowel is narrowed by removing a V-shaped wedge of gut indicated by dotted lines.

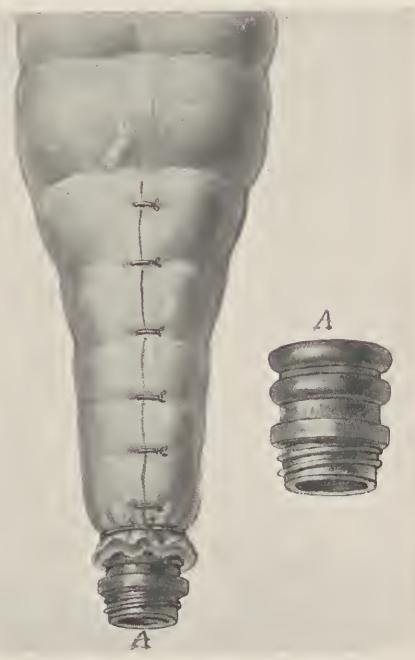


Fig. 605.—The gut, narrow below and bulging above, after being ligated about a hard-rubber corrugated tube, is brought down and anchored in a buttonhole skin incision by two angle stitches (Fig. 606).

Gersuny after excising the growth made a *three-quarter twist* (Fig. 602) in the bowel before attaching it to the integument. The author has resorted to these procedures several times, and of the two, prefers Gersuny's technic.

Where the sphincter had been sacrificed the author has in several cases succeeded in giving the patient partial or complete control over movements by narrowing the gut and removing a V-shaped piece and bringing the gut out through a buttonhole slit in the skin (Figs. 604, 605, 606).

The writer has attempted to prevent incontinence by suturing the gut to the anus and encircling it with bands of the gluteus maximus muscle, as suggested by Chetwood (Fig. 603), but results were unsatisfactory.

Following extirpation of the rectum and anus the proximal end of the bowel according to its length and mobilization is sutured to the skin of the abdominal, sacral, coccygeal, or anal region

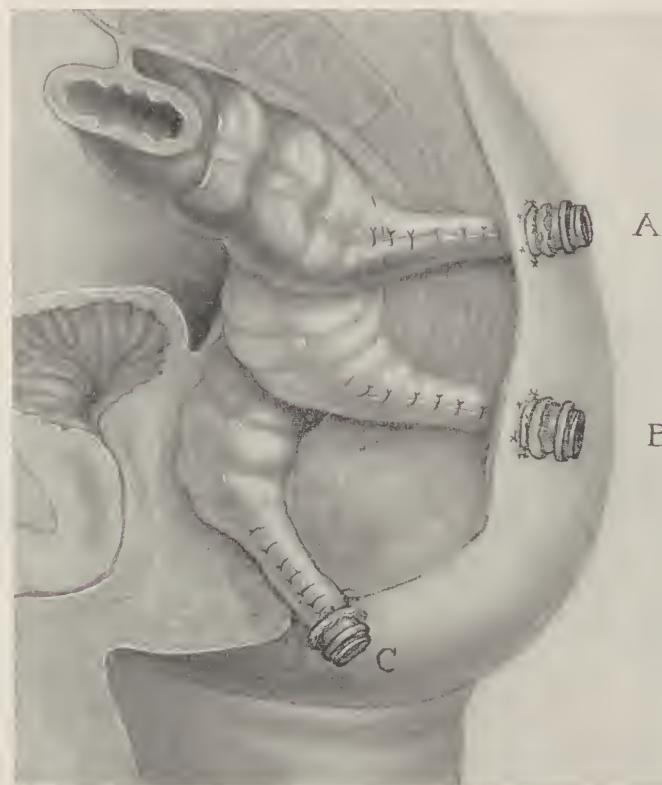


Fig. 606.—Following isolation and amputation of cancerous rectum the terminal bowel is narrowed after the author's plan: V-shaped flap is removed and the gut is ligated about a hard-rubber tube (Fig. 605, A) and brought out through a buttonhole skin incision made in (A) the sacral, (B) coccygeal, or (C) anal region and sutured to the skin.

(Fig. 606, A, B, C). When it is advisable to establish an abdominal artificial anus the proximal end of the gut is disposed of after the plans described when discussing methods of dealing with gut ends when colostomy is performed in conjunction with excision.

Method of Dealing with Bowel Ends When the Sphincter is Preserved.—When the anal muscle is not involved by malignancy and is left intact, functioning power of the rectum as regards

continence is maintained in most cases following extirpation of the middle or upper rectum or sigmoid flexure. There are several ways of accomplishing this, but it is difficult to determine the method of choice before operation.

When the growth is high the cancerous bowel is excised and proximal and distal ends are joined by lateral or end-to-end anastomosis (Fig. 638), provided the mesosigmoid is long and the gut is easily mobilized.

Colorectostomy is substituted for *entero-anastomosis* where the growth is inoperable and situated above the peritoneal reflection. This operation requires less time than entero-anastomosis and danger of peritonitis from leakage is not so great, because gas and feces pass through the end of gut projecting into the rectum.

The technic of colorectostomy (Figs. 509, 510) as practised in the author's cases consisted in (a) dividing the bowel between clamps above and below the growth and excising the tumor; (b) ligating the proximal end about a rubber tube with cat-gut and closing the distal end with purse-string and infolding sutures; (c) splitting the anterior rectal wall and pushing the tube and attached bowel through it until the tube projected beyond the anus; (d) approximating peritoneal surfaces of gut segments with a double line of sutures, and, (e) closing the abdomen. This technic has the advantage over Kelly's operation accomplished with traction sutures, since the tube makes approximation of bowel ends easier and protects the suture line by allowing gas and feces to escape through it without coming in contact with the suture line.



Fig. 607.—Author's technic of ligating bowel about his corrugated hard-rubber tube, and pulling proximal end of gut through the rectal stump denuded of mucous membrane and attaching it to the perianal skin, S, the sphincter left intact.

When cancer is situated at a safe distance above the sphincter or near the rectosigmoidal juncture, it is excised and continuity of the bowel re-established by anastomosis, using sutures or Murphy's button or employing the technic of Hochenegg, Morestin, Maunsell, Weir, Steinthal, or Perron described below. Posterior fecal fistula is a frequent complication when the abdominal gut is sutured to the lower rectum which does not possess a peritoneal covering.

Hochenegg.—Hochenegg's "pull through" method (Fig. 607) requires less time than entero-anastomosis, is rarely followed by fecal fistulæ, and does not interfere with the sphincter. Following extirpation of the growth the distal stump is denuded of mucosa when the proximal gut end is drawn through it and sutured to the perianal margin, permitting the bowel to *project* beyond the anus, which lessens danger of infection. The "pull through" method is not feasible when the proximal gut is short and cannot be attached to the anus without tension.

Morestin.—Having the same object in view, Morestin reversed Hochenegg's procedure, removed mucosa from the lower $\frac{1}{2}$ inch (12.70 mm.) of the proximal and muscular coat for a similar distance from the distal gut end, and spliced the bowel by pulling the former down over the latter, "cuff-like," suturing it in this position. The author employed this procedure several times, but was not favorably impressed, because the suture line usually gave way and fecal fistula followed, and he prefers to re-establish continuity of the bowel in the ordinary way when joining gut ends is feasible.

Maunsell, Weir, Steinthal.—Maunsell and later Weir and Steinthal described a method wherein the malignant bowel with aid of forceps or traction sutures is prolapsed downward through the rectum and out at the anus, where the growth is removed and divided ends anastomosed, after which the gut is permitted to retract through the anus.

Perron applied this idea in approximating gut ends following extirpation of low rectal cancer when the sphincter is preserved. He introduces forceps from below, seizes the distal end and invaginates it, forceps are then reintroduced, the proximal end is seized and withdrawn and sutured to the invaginated lower end outside the anus, following which the anastomosed bowel is replaced. In suitable cases this procedure is safe and reliable and worthy of a trial in selected cases.

In his earlier operations the author practised the following technic frequently employed by English surgeons:

Following sphincteric divulsion and eversion of the anus the

rectum is severed just above the anal muscle; after the proximal end has been freed, seized, drawn downward, and ligated above traction forceps, the sphincter and other structures were incised backward to the coccyx and the diseased bowel freed from its attachments. When only a small segment of gut is removed, no attempt is made to approximate the ends, but when the part removed is of considerable proportions, the proximal end is mobilized, brought down and sutured to the distal, and the operation completed without impairment of the sphincter by closing the posterior incision.

In order to perform a cleaner operation he has on different occasions modified the above technic by first suturing the anus and freeing the rectum through a posterior median incision after removing the coccyx and then dividing the lower end of the bowel between ligatures just above the sphincter, and finally suturing the ends together after the growth had been extirpated and the ligatures and anal suture removed. Some very good results were thus obtained, but a more recent and larger experience in rectal extirpation has convinced the author that this and the above technic are not so good as those of Hochenegg and Perron.

The author will conclude his discussion of the different ways of dealing with the proximal end and preserving the sphincter muscle by describing one other method of accomplishing this result. This consists in freeing and ligating the anal mucosa, splitting the external sphincter anteriorly and posteriorly (Fig. 643) to obtain necessary room for the dissection, excising the growth, suturing the proximal bowel to the skin, and approximating anterior and posterior incisions, sphincter ends with catgut, thus restoring the muscle to its original position.

Postoperative Treatment Following Anorectal Extirpation.—The patient is quickly transferred to a bed previously warmed by hot-water bags or electric pads, given heart stimulants, preferably pituitrin, with saline infusions or hypodermoclysis if in shock, or colonic saline injection if an artificial anus has been formed, and morphin, gr. $\frac{1}{4}$ (0.016), to relieve pain, quiet restlessness, and induce sleep. Some surgeons lift the foot of the bed to diminish bleeding, but the author prefers the Fowler posture so blood will gravitate downward into dressings, to be recognized if there is hemorrhage, and because this facilitates drainage and minimizes the danger from peritonitis.

Water is temporarily forbidden till nausea and vomiting cease, and thereafter prescribed in liberal amounts until kidneys are working normally. Catheterization is sometimes necessary when

the vagina, bowel, or perirectal space has been tightly packed with gauze, or in decrepit and old people. Outer dressings are inspected at short intervals, being replaced and supported by a firm binder when there is evidence of oozing, and the patient's position is changed if he is uncomfortable.

After forty-eight hours drains are removed, being reinserted if necessary, and the bowel is opened external to dressings and a tube is inserted when the gut has been closed during operation.

Solid food is prohibited and liquid nourishment prescribed at short intervals, which with an occasional opiate prevents bowel movements until the eighth day, when an evacuation is procured with castor oil, unless an artificial anus has been established, when solids may be taken earlier. Thereafter dressing and drainage-tubes are changed and the wound irrigated with hot boric or Carrel-Dakin solution after each stool. At the end of a week sloughing tissues and sutures are removed with scissors, the buttocks are strapped with adhesive, and the sufferer permitted to assume a sitting posture to facilitate drainage into the dressings. Most patients are ordered out of bed in two and discharged in three weeks, unless wounds are extensive and suppurating. When there is tendency to stricture as healing progresses the bowel caliber is occasionally increased by insertion of finger or bougie. Primary healing of the entire wound is seldom obtained in proctectomy operations, though some surgeons claim the reverse.

The Mayos do not repack after removing drains, and instead fill the wound with Van Arsdale's fluid, 5 per cent. balsam of Peru in castor oil.

Chapter LVII

Malignant Growths of the Rectosigmoidal Juncture, Rectum, and Anus (*Continued*)

AMPUTATION, RESECTION—INFERIOR PROCTECTOMY—EXCISION

Inferior Proctectomy—Perineal Excision—Lisfranc's Operation.

—Formerly this procedure was limited to anal and low rectal growths, but as technic improved, *perineal* has gradually superseded *sacral* excision, and experts employ this procedure or *vaginal* extirpation when removing neoplasms situated in the *ampulla* or higher up, and resort to Kraske's operation only when the tumor is situated at the *rectosigmoidal juncture* and cannot be removed otherwise, in which case abdominoperineal proctectomy is preferable.

Usually the gut is amputated, but in selected cases may be resected, for with present methods a much longer piece of gut, 4 to 12 inches (5.08–30.48 cm.), can be mobilized than when perineal excision was inaugurated, and inferior perineal proctectomy is now employed in extirpating growths located in the upper rectum or sigmoid flexure by the combined operation.

Inferior proctectomy is the operation of choice in men because it is less difficult, causes little shock, slightly impairs pelvic supports, is rarely complicated by serious hemorrhage, entering the peritoneal cavity is not always necessary, and the mortality is low—7 per cent.—and a normal anus is more often left which prevents fecal incontinence, and recurrence is about the same as following other excisions.

Resection is usually contraindicated because the rectum is devoid of *peritoneal* covering, union is not obtained, and leakage takes place at the suture line causing troublesome fistula; sloughing from tension also is a frequent complication.

Abdominal perineal proctectomy is indicated in upper rectal, sigmoidal, and neglected cancers of the ampulla, when there is reason to suspect anorectal and lymph-nodes distributed along the inferior mesenteric and superior hemorrhoidal vessels (Fig. 660) are involved.

Formerly operators seldom incised the serosa in perineal excision, but surgeons now deliberately open the peritoneum to

facilitate mobilization of the rectum, ligation of vessels, and wide extirpation of diseased glands.

Steps in inferior proctectomy are varied, depending on the size, *location*, and *mobility* of the neoplasm, whether the rectum is to be amputated or resected, the *sphincter sacrificed* or *preserved*, and whether operation is to be performed in connection with abdomino-perineal extirpation.

When *outlining* the history and evolution of anorectal proctectomy the author briefly described original features in the technic

of pioneer and modern surgeons regarding inferior, superior, and combined excision, and a review of the subject is sufficient to convince the reader that the technic of no *individual* operator fully meets all requirements.

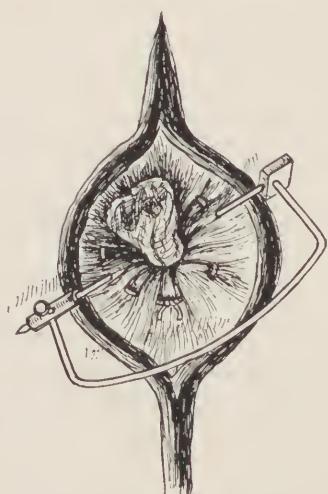
The author does not lay claim to originality in the technic given below describing different methods of anorectal extirpation, the steps in the operations as outlined comprising suggestions of other surgeons and original features of his own.

Author's Technic of Inferior Proctectomy When the Sphincter is Sacrificed.—It is useless to attempt to preserve the sphincter when cancer involves perianal skin, the muscle, or lower anal canal; in such cases the following technic has proved satisfactory:

Fig. 608.—Perineal proctectomy. Lines of incision when sphincter is sacrificed and manner of closing anus with gauze surrounded by a purse-string suture and author's steel safety-pin, which is sometimes substituted for his metal retractor (see Fig. 611).

The patient, prepared, catheterized, and anesthetized, is placed in the lithotomy position, legs flexed upon the abdomen, buttocks elevated with sand-bags and projecting beyond the table, which is of suitable height to permit the surgeon to work comfortably.

First Step.—The rectum is swabbed with peroxid of hydrogen or surgical iodin and dried; the anus and surrounding integument are painted with iodin, a sound is introduced into the bladder—for identification—the anus is tightly closed about the gauze plug with a strong linen anal purse-string suture which prevents leakage, and the author's safety-pin (Fig. 608) is introduced when his metal tractor (Fig. 611) is not employed.



Second Step.—An incision is made which encircles the anus $\frac{1}{2}$ inch (12.70 mm.) from the margin and extends anteriorly into the perineum and posteriorly to the coccygeal tip (Fig. 608), following which loosened perianal skin retracts.

Third Step.—If dissection is interfered with because of a large or high growth, the coccyx is excised with the author's heavy blunt scissors (Fig. 609), disarticulated from the sacrum or deflected backward; in extreme cases to obtain still more room attachments



Fig. 609.—Inferior proctectomy. Method of excising coccyx with the author's special hook and scissors when additional room is required.

on one side of sacrum are severed and the wound momentarily packed with hot compresses (Fig. 610) to arrest hemorrhage.

Fourth Step.—The posterior cut is deepened, separating two halves of levator ani, dividing these (Fig. 610) and other muscular and ligamentous attachments; the index-finger is introduced into the retrocellular tissue; the bowel separated from its lower posterior attachments, and the growth defined to determine whether removal of bony structures is necessary, and if so, to what extent.

Fifth Step.—Through the posterior cut with fingers, scalpel, or blunt scissor the upper rectum is quickly freed from the sacrum and separated from anterior and lateral attachments.

Sixth Step.—Working from above downward—which is easier—the levator ani and lateral attachments are hooked up with the

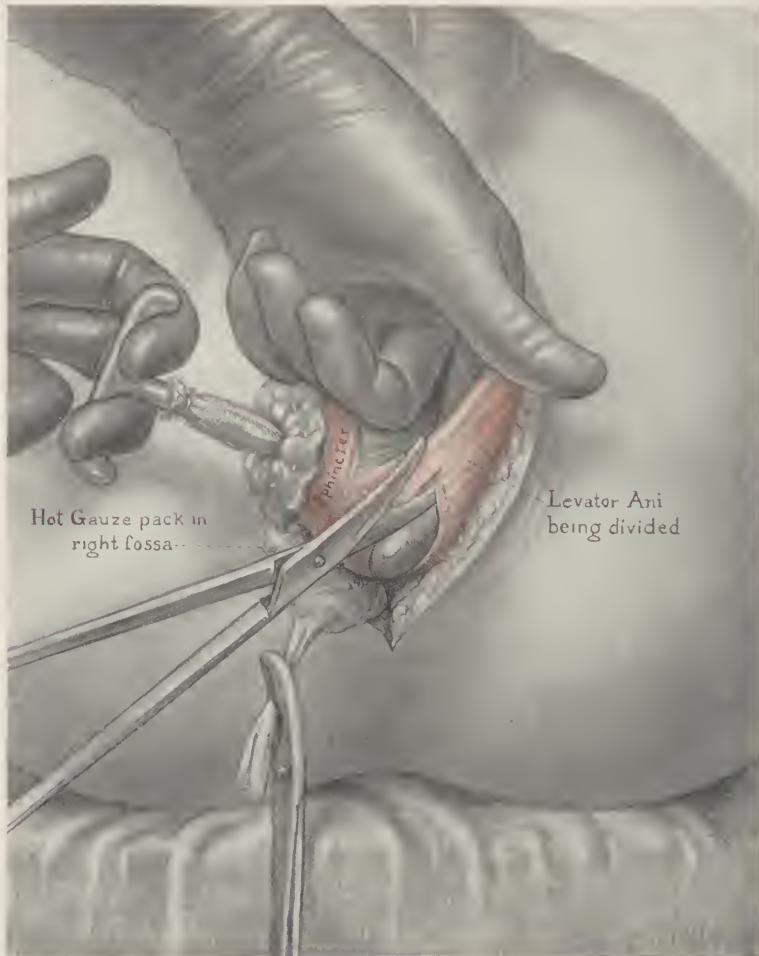


Fig. 610.—Inferior proctectomy. Lower rectum freed, lifted upward with the author's tractor, and levator ani being severed from rectum with scissors following hooking up of muscle with the index-finger. Hot gauze pack introduced behind rectum to control bleeding.

finger, ligated with catgut—or temporarily clamped—and divided (Fig. 610), isolating the rectum at the sides and posteriorly, except for attachments near the anus, which are quickly severed with knife or scissors.

Seventh Step.—The anterior incision is deepened and the rectum carefully dissected from its attachments—urethra, seminal vesicles, prostate, or vagina; this is the most difficult part of the operation, as the adjacent organs are easily injured unless work is done carefully under the eye after the bladder has previously been emptied and a guiding sound introduced.

Eighth Step.—A Gant waterproof bag with attached handle (Fig. 625) is snugly tied about the mobilized rectum—for use as a tractor and to prevent escape of the rectal content, or the gut is ligated about his metal tractor (Fig. 611), and the peritoneum is stripped upward on all sides with the finger after hemorrhage has been controlled by hot packs.

Ninth Step.—The bowel is drawn downward for amputation or resection by pulling the bag handle or tractor, unless tension



Fig. 611.—Author's metal retractor employed in proctectomy operations.

prevents; in which case peritoneum is incised laterally or all round, lateral ligaments of the rectum are divided, fascia severed, the superior hemorrhoidal artery ligated, if necessary, and the mesorectum and mesosigmoid divided near the sacrum with scissors, using the finger as a guide, whereupon under traction the bowel is brought outside the anus from 6 to 14 inches (15.24–35.56 cm.) (Fig. 618), when it is amputated with knife or cautery after being ligated about the author's hard or a large rubber tube left long to project through dressings and subsequently prevent soiling of the wound by gas and feces.

Tenth Step.—Previously clamped, spurting vessels are ligated, oozing controlled by hot gauze packs (Fig. 610), the peritoneum if opened (Fig. 626) is snugly sutured to the serous coat of the bowel (Fig. 638) to minimize danger of infection and prevent hernia of small intestine.

Eleventh Step.—Lateral ligaments, fascia (Fig. 635), and the levator ani muscles are in turn sewn to the gut to restore pelvic support (Fig. 639), close dead spaces, and give partial or complete control over the movements.

Twelfth Step.—Following closure of anterior and posterior cuts with a chromic inner and linen or wire external sutures and insertion

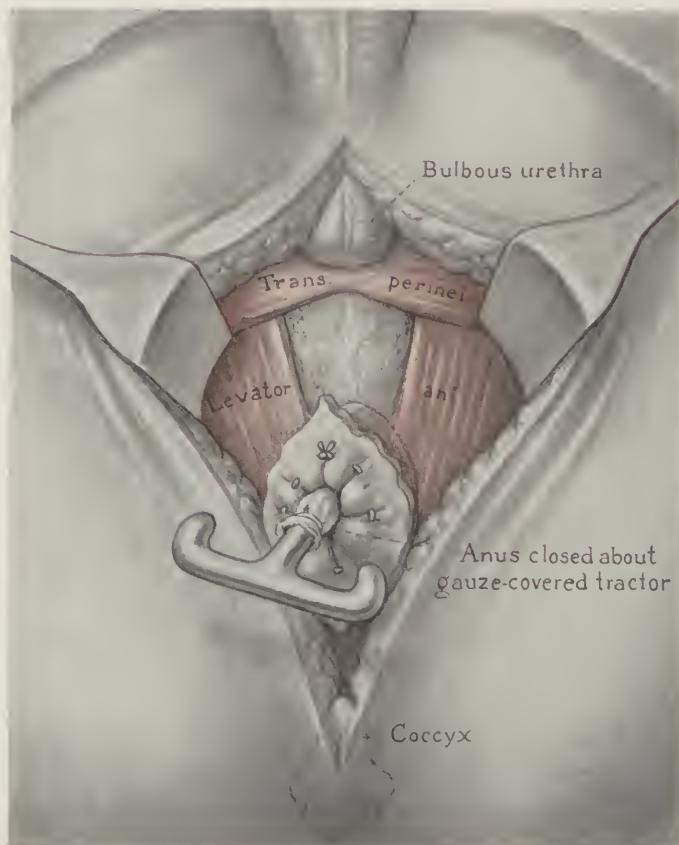


Fig. 612.—Inferior proctectomy. Showing enlarged incision, muscles exposed by dissection, and anus closed about author's tractor.

of cigarette drains in angles of the wound with projecting rubber tube, the rectum or sigmoid is attached to the circular skin incision by a few interrupted stitches which are preferable to a continuous suture that interferes with drainage.

The freed diseased segment, left intact, is amputated externally beyond the anus after being ligated about a large rubber tube (Fig. 615); if not previously attached or amputated step-by-step,

as vessels are ligated, and it is sutured to the skin, or the author's inflatable bag is inserted and distended to control bleeding, close dead spaces to prevent retraction and permit gas and feces to escape into the author's fecal reservoir (Fig. 614) without coming in contact with the wound.

Thirteenth Step.—The operation is completed by cleansing, painting the parts with surgical iodin, and applying dressings and

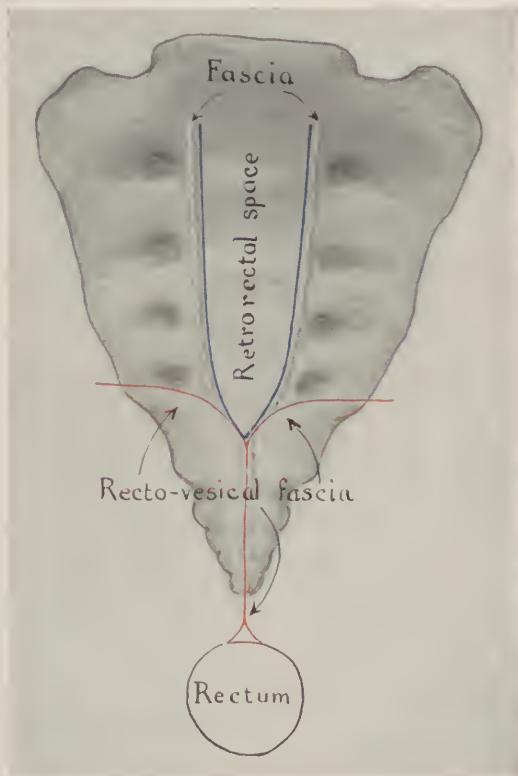


Fig. 613.—Showing important *fascias* severed in perineal, vaginal, and sacral proctectomy when freeing the rectum from the sacrum, coccyx, and retrorectal space.

a snugly adjusted T-binder through which the rectal tube is left projecting, to provide for the harmless escape of gas and feces at all times (Fig. 614).

Comments.—The levator ani when accurately sutured about the rectum (Fig. 639) gradually gives the patient more or less control over movements; the degree of incontinence following excision can be further minimized by *twisting the bowel upon itself* (Fig. 602),

splitting the gluteus maximus, and pulling gut through the muscle before suturing it to the integument.

To further lessen the degree of incontinence when the sphincter is sacrificed the gut is narrowed, brought out through a buttonhole

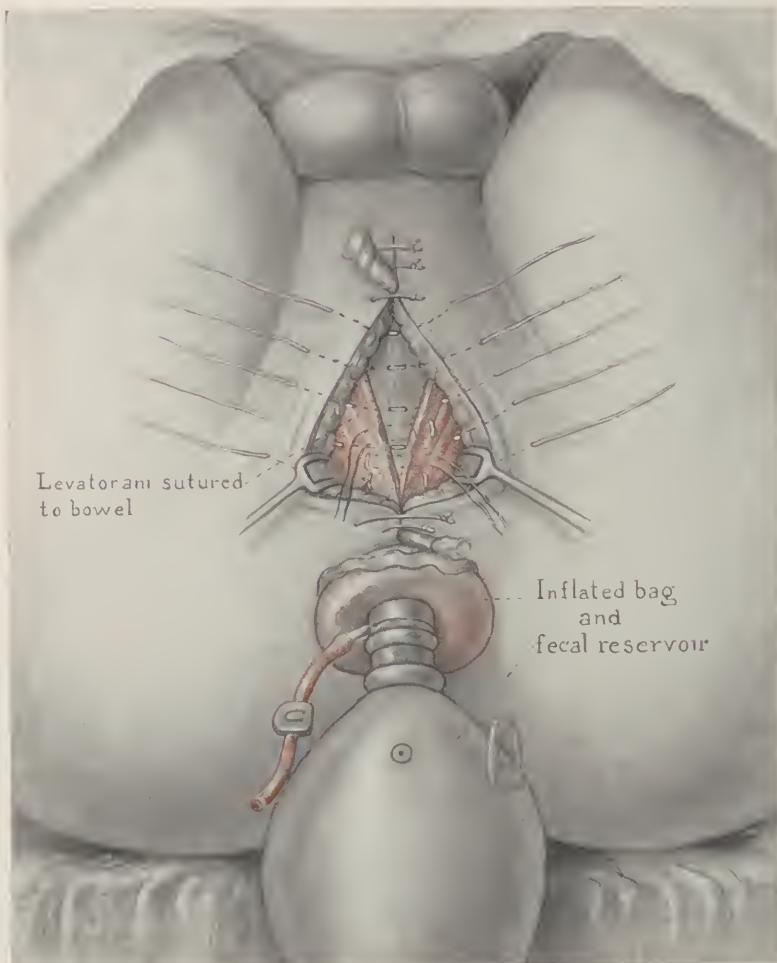


Fig. 614.—Inferior proctectomy. Final steps in which bowel is amputated with cautery and sutured to the skin after it has been ligated about the author's inflatable bag (Fig. 616), to which his fecal reservoir is attached. Edges of levator ani are shown stitched about bowel, and the wound is drained above and below and closed by deep superficial and retention sutures.

incision, and sutured to the skin after the author's plan (Figs. 604-606).

When feasible, to diminish danger of peritonitis extirpation is completed without incising the peritoneum, though it may be

necessary to mobilize the skin upward or make no attempt to bring the retracted gut to the anus (Fig. 617), which is not a serious disadvantage, since mucosa quickly fills the intervening space.

Tension on gut and vessels is avoided, for it may be followed by gangrene, toxemia, sepsis, and death; complications that, when necessary, are forestalled by making a *vaginal*, *coccygeal*, or *sacral* anus (Fig. 606), and by opening the abdomen and mobilizing the



Fig. 615.—Inferior proctectomy. Method of completing the operation when the author's hard-rubber tube is substituted for the inflatable bag. Note position of drains, method of closing wound, and manner in which the gut is left projecting beyond the skin to minimize danger from infection. The tube about which the gut is ligated is closed with a rubber cork which is removed at opportune times to permit the escape of gas and feces.

gut the desired distance by dividing vessels and mesenteric attachments (Fig. 642).

Ligation of the lateral and middle sacral arteries is seldom required, since packing with hot compresses effectively controls hemorrhage, and the superior hemorrhoidal branches and other large vessels are usually left to be tied when the bowel is divided with knife or cautery.

Inferior Proctectomy with Preservation of Sphincter.¹—Fecal

¹ Steps in this procedure are in many respects similar to those illustrated in Vaginal Proctectomy.

incontinence is deplorable and to be avoided, but when endeavoring to prevent it, one should not excise the gut close to the neoplasm, as recurrence is certain and the patient's life is sacrificed in efforts to preserve the sphincter. The author does not attempt to save the anal muscle unless the lower margin of the growth is more than 1 inch (2.54 cm.) above the anus.



Fig. 616.—Author's inflatable bag which when introduced and distended prevents retraction of the bowel, fills all dead spaces (Fig. 614), arrests bleeding, and enables gas and feces to escape into the attached fecal reservoir at all times (Fig. 614).

Partial or complete incontinence may follow, though the muscle is left intact and the anus appears normal, the result of injury to inferior hemorrhoidal or nerves controlling the sphincter.

Of the several methods of preserving the sphincter in perineal excision, those described below have proved most reliable in the author's cases.

Author's Technic.—*First Step.*—With patient in exaggerated left Sims' position, hips elevated, skin painted with iodin, rectum swabbed with peroxid and catheter inserted, the anus is tightly closed around gauze and metal retractor by a purse-string suture.

Second Step.—A curvilinear incision beginning at the third sacral vertebra is made on the right side of the sacrum and coccyx to the coccygeal tip, and then along the posterior median line to within $\frac{1}{2}$ inch (12.70 mm.) of anal margin, the bowel exposed by deepening this cut throughout its length, and excising (Fig. 609) or displacing the coccyx backward.

Third Step.—The rectum, between the levator ani muscles below and peritoneal reflection above, is quickly isolated by peeling it from the sacrum and separating the gut posteriorly from attached structures with fingers or knife, scissors being unnecessary, except to sever restraining fascia.

Fourth Step.—Working from above downward, lateral and anterior surfaces of the bowel are partially freed by hooking up with the finger, ligating and dividing the levator ani (Fig. 610), following which fascia and muscular attachments are dissected from the rectum to the upper sphincteric border.

Fifth Step.—The loosened rectum is drawn into the wound with fingers, strip of gauze (Fig. 635), or retractor (Fig. 612), and retained while gut is being separated from its intimate anterior attachments (seminal vesicles, prostate, deep urethra (Fig. 618), or vagina) with blunt scissors or handle of scalpel, using a previously introduced sound as a guide.

Sixth Step.—Downward traction is made with the left hand while peritoneum is stripped upward for 1 inch (2.54 cm.) or more with the right index-finger to loosen bowel high up (Fig. 625). Failing to obtain sufficient gut for anastomosis of proximal and anal extremities following excision—extirpation—of the growth, peritoneum is divided all around (Fig. 626), lateral ligaments and the mesorectum are severed and the superior hemorrhoidal artery ligated, if necessary, procedures that mobilize the bowel to the desired extent.

Seventh Step.—Peritoneum is joined to intestinal serosa by interrupted catgut sutures (Fig. 638) to prevent infection or hernia of small intestine; oozing is controlled by hot compresses (Fig. 618),

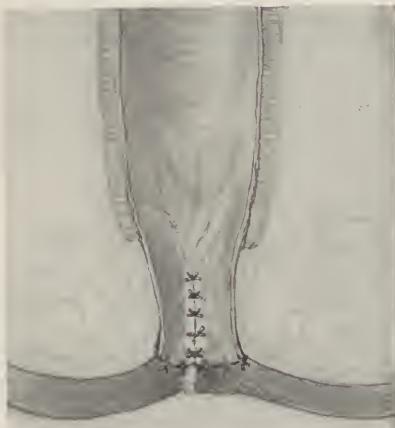


Fig. 617.—Author's method of forming a mucous channel when all rectal coats of the stump cannot be brought down and sutured at the anus in perineal proctectomy.

the rectum is doubly ligated with tape or clamped not less than 1 inch (2.54 cm.) above and below the growth well above the sphincter (Fig. 626), and the cancer excised by dividing the gut

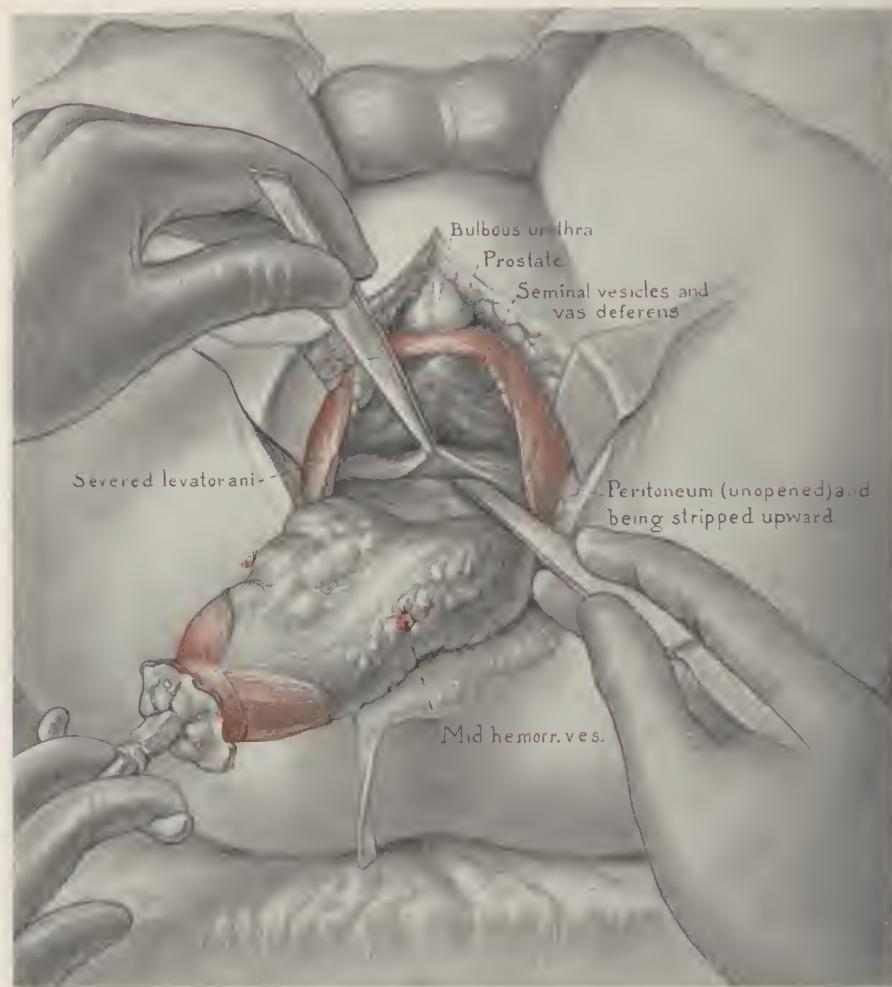


Fig. 618.—Inferior proctectomy. Levator ani divided, middle hemorrhoidal arteries ligated, and peritoneum stripped upward (without being opened), which permits a high segment of the bowel to be amputated. Notice position of bulbous urethra, prostate, seminal vesicles, vas deferens, and hot gauze pack.

between the two sets of ligatures with cautery (Fig. 626) or angiotribe and scissors.

Eighth Step.—The purse-string suture is cut, gauze is removed from the rectum, and the ring-like strip of mucosa lining the anal segment is excised following divulsion of the sphincter.

Ninth Step.—Following approximation of the levator ani with the new rectum (Fig. 639) the posterior wound is closed with interrupted chromic reinforced by silkworm-gut stitches passing through the intestinal musculature.

Tenth Step.—The proximal end of the bowel is brought through the anus for $\frac{1}{2}$ inch (12.70 mm.) or more (Fig. 641) and attached to



Fig. 619.—Appearance of bandage and fecal reservoir at completion of the author's vaginal and perineal proctectomy operations.

the perianal skin by interrupted linen or chromicized catgut sutures—when the bowel is left temporarily closed—or it is amputated and attached to or ligated around a projecting rubber tube (Fig. 630) unless the author's inflatable bag is inserted and distended to control bleeding and eliminate dead spaces (Fig. 616).

Eleventh Step.—Following insertion of two drains, one in the upper or peritoneal, the other at the anal end of the incision, the sound is removed and dressings supported by a T-binder snugly placed about the author's hard-rubber tube, which permits gas and feces to escape without contaminating the wound, or his soft-rubber fecal reservoir (Fig. 619), which prevents the leakage of gas and feces, is attached to his inflatable tube (Fig. 616).

Comments.—The operation is frequently performed through the curvilinear incision without removing or deflecting the coccyx.

The sphincter may also be preserved by extending the incision to the anus, cutting and deflecting the *split sphincter* to either side (Fig. 643, C, D) until the neoplasm has been excised and the bowel sutured to the denuded anus, when the sphincter muscle and wound edges are approximated with catgut or linen.

Again, the sphincter muscle may be left intact when the growth is high by anastomosing the distal and proximal gut ends with Murphy's button or suture following extirpation of the growth, but non-union and posterior fecal fistula are to be anticipated when the lower or rectal stump does not possess a peritoneal covering.

Maunsell, Weir, and Steinthal avoided injury to the anal muscle by prolapsing gut and tumor through the anus where the bowel was resected; Perron, after extirpating cancer, everted the rectal stump and drew the proximal end through it, making the anastomosis external to the anus.

When *sigmoidoproctostomy* (Fig. 509) is performed in connection with excision, function of the sphincter is not disturbed.

The author prefers Hochenegg's *pull-through* method (Figs. 607, 638) to other procedures designed to preserve the sphincter, the technic of which consists in denuding the anal stump of mucosa, drawing the proximal end through and suturing it to the perianal skin. This method of dealing with the bowel end minimizes the danger of fecal fistula and incontinence.

Morestin spliced the bowel after removing the muscular from the upper and mucosa of the lower segment for $\frac{1}{2}$ inch (12.70 mm.).

In this and other extirpation operations the mesorectum or mesosigmoid are incised close to the sacrum to mobilize the gut, avoid injury to large vessels, and insure complete removal of glands.

Hemorrhage is controlled by hot compresses and ligatures, but when a large high vessel is cut and cannot be tied, it is caught with pressure forceps (Fig. 549) which are left *in situ* after the detachable handles have been removed.

Chapter LVIII

Malignant Growths of the Rectosigmoidal Juncture, Rectum, and Anus (*Continued*)

POSTERIOR (SACRAL) VAGINAL AND ABDOMINOPERINEAL PROCTECTOMY—(EXTIRPATION)

Posterior Proctectomy—Sacral Excision—Kraske's Operation.

—In this procedure the rectum is approached from behind and dissected out from above; to accomplish which the coccyx alone or it and a section of the sacrum is removed or detached on one side and deflected.

Sacral extirpation is usually designated Kraske's operation because of the impetus given it by him; for a time it superseded other procedures, but because of disadvantages mentioned below it has lost in favor and has been nearly displaced by perineal vaginal and combined excision.

Surgeons no longer follow Kraske's technic closely when performing sacral or posterior proctectomy. The author resorts to the operation only for growths involving the upper third of the rectum or rectosigmoidal juncture, because neoplasms lower down are removed easier, with less danger, and no greater chance of recurrence by *perineal* or *vaginal excision*.

Advantages claimed for sacral proctectomy are: (a) It permits extirpation of growths too high for inferior proctectomy, (b) immediately exposes the gut, (c) the peritoneum is opened and closed while in view, (d) lateral ligaments are easily detected and incised, (e) the superior hemorrhoidal and sacral arteries are discovered and ligated with less difficulty, and (f) additional room obtained facilitates anastomosis when a sacral anus is not formed.

Disadvantages of sacral excision—Kraske's operation—are: (a) it is bloody; (b) causes considerable shock; (c) necessitates opening the peritoneal cavity; (d) often causes fecal incontinence through injury to the fourth sacral and other nerves controlling the sphincter; (e) accompanying loss of bone weakens pelvic support (Fig. 621); (f) it is followed by posterior fecal fistula when bowel ends are approximated; (g) peritonitis is frequent; (h) prolapse of the bowel through the sacral anus is common (Fig. 622); (i) position of the sacral opening is inconvenient and makes sitting

uncomfortable (Fig. 624); (*j*) removal of high lymph-nodes is impossible; (*k*) mortality is higher (10 per cent.) than for inferior (7 per cent.) or vaginal (8 per cent.) proctectomy; (*l*) the operator is tempted to do less radical work in his effort to save the sphincter; (*m*) the patient has no control over the anus, and feces involuntarily escape, mucus exudes through it to excoriate perianal skin (Fig.

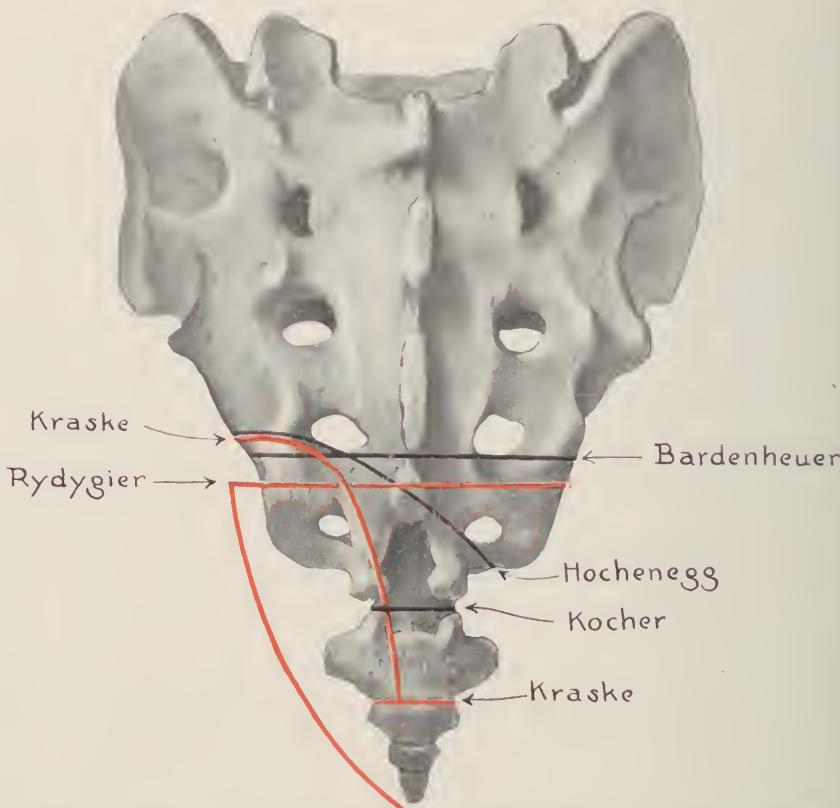


Fig. 620.—Posterior (sacral) proctectomy. Lines of bone incision employed by different operators in Kraske's excision—sacral proctectomy.

623), and (*n*) when an osteo-integumentary flap is formed (Fig. 629) union may fail or soft and bony structures necrose and slough out.

Steps in sacral excision vary, depending on whether bone is removed, an osteo-integumentary flap operation is performed, or the bowel is resected or amputated.

Author's Technic When the Coccyx and a Section of the Sacrum are Removed.—This procedure is satisfactory when too much bone is not sacrificed.

First Step.—Following the usual preparation, placing the patient in the left Sims' posture, hips elevated, *introduction of sound*, swabbing rectum with peroxid of hydrogen, painting the skin with



Fig. 621.—Posterior (sacral) proctectomy. Author's lead clip bent, which, adjusted over the divided sacrum, arrests bleeding and prevents laceration of the hand by the bone.

iodin, and closing anus about gauze plug with purse-string suture (Fig. 625) and author's safety-pin tractor, a posterior median



Fig. 622.—Prolapse of rectum and sigmoid through sacral anus following rectal excision: A, Location of anus.

incision is made, extending from the second sacral foramen to the posterior sphincteric border (Fig. 625, A), or further back (Fig. 625, B), as shown in the insert, when the muscle is to be sacrificed.



Fig. 623.—Appearance of sacral anus two weeks following rectal extirpation.

Second Step.—Soft parts are dissected from osseous structures, and muscular and ligamentous attachments are quickly severed



Fig. 624.—Appearance of very good sacral anus six months following rectal extirpation for cancer; + indicates position of the anus excised with rectum.

from the tip and sides of the coccyx and sacrum to the upper margin of the third sacral vertebra with bold strokes of knife and scissors (Fig. 625, insert).

Third Step.—Skin and structures overlying the bone are widely separated with retractors; the bone is divided with chisel,

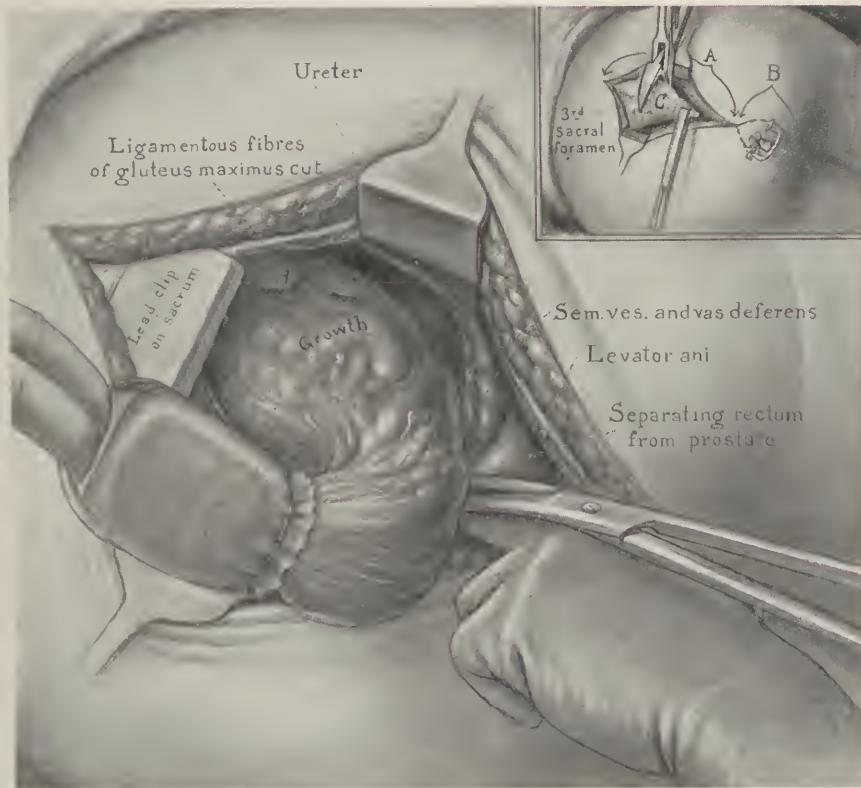


Fig. 625.—Posterior sacral proctectomy. Superior sacral proctectomy. Insert shows method of closing anus with gauze purse-string suture and author's safety-pin tractor: A, Line of incision when anal muscle is preserved; B, continuation of incision when sphincter is sacrificed. Sacrum and coccyx excised with bone forceps distal to third sacral foramen. Main picture shows author's lead clip (Fig. 621) hammered over rough end of sacrum to arrest bleeding and prevent injuring hand on the bone. Author's water-tight tractor bag ligated about bowel to prevent leakage, and rectum lifted upward and being freed from prostate and other structures following division of levator ani muscle. Note position of the ureter, seminal vesicles, vas deferens, and (A) severed lateral ligaments of the rectum.

saw, or bone forceps (Fig. 625, insert) immediately below the third sacral foramina—to preserve the nerves—following which the sacrococcygeal segment is removed *en masse* after separation from their anterior attachments with scissors and fingers.

Fourth Step.—Spiculae of bone are trimmed off, a *lead clip*

(Fig. 621) is snugly adjusted about the sacral stump to arrest bleeding from end of the bone, and prevent subsequent laceration of glove, bowel, or hand (Fig. 625); the rectum is quickly exposed by blunt dissection and method of dealing with bowel determined.

Fifth Step.—When the neoplasm is low and the sphincter must be sacrificed, beginning above at the peritoneal attachment the

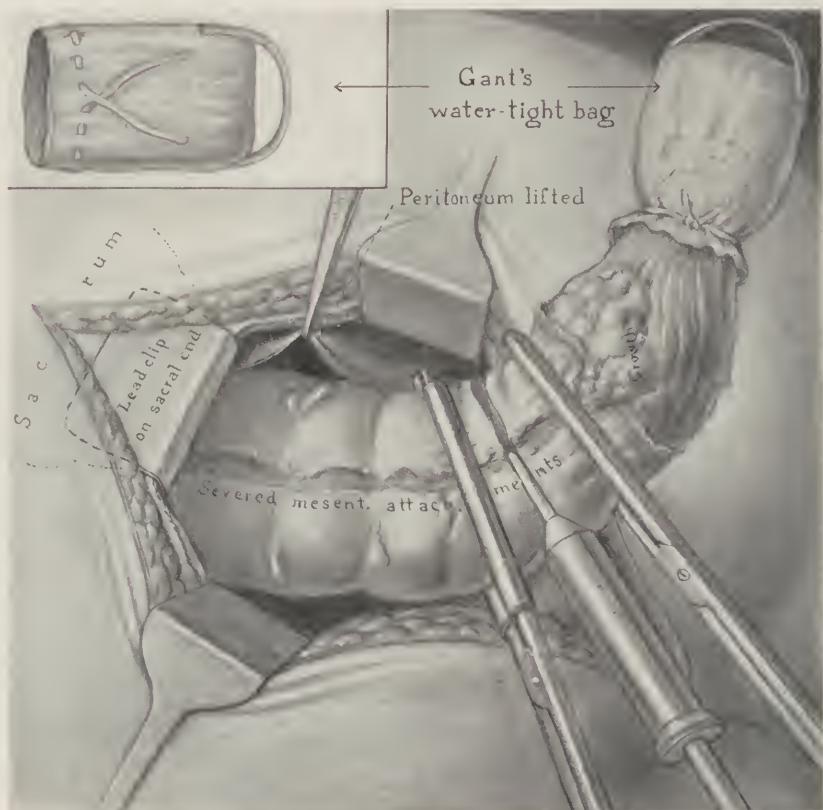


Fig. 626.—Posterior sacral proctectomy. Peritoneum opened, rectum and sigmoid brought down and out of wound, and cancerous bowel being amputated with cautery between clamps. Insert shows author's water-tight tractor bag which prevents soiling of the wound by leakage and takes the place of tractor forceps.

rectum is quickly mobilized by clean dissection made with scalpel handle and scissors, stopping at intervals to control bleeding with hot packs or ligatures.

Sixth Step.—After peritoneum has been incised around the gut (Fig. 635) or stripped upward (Fig. 618), the bowel is divided following crushing of the gut or between double ligatures or clamps with cautery (Fig. 626) at a safe distance from the growth.

Seventh Step.—The proximal extremity of the bowel is ligated about a rubber tube (Fig. 630), after the correct size of the opening has been determined by introduction of the index-finger (Fig. 627), and drawn down to form a sacral anus (Fig. 627), or in rare instances when sufficiently mobilized to the perianal skin to which it is attached by interrupted linen stitches after the levator ani has been reapproximated (Fig. 639); drains are inserted or a large tube (Fig. 627, insert) introduced into the rectum if the bowel is immediately amputated (Fig. 616).

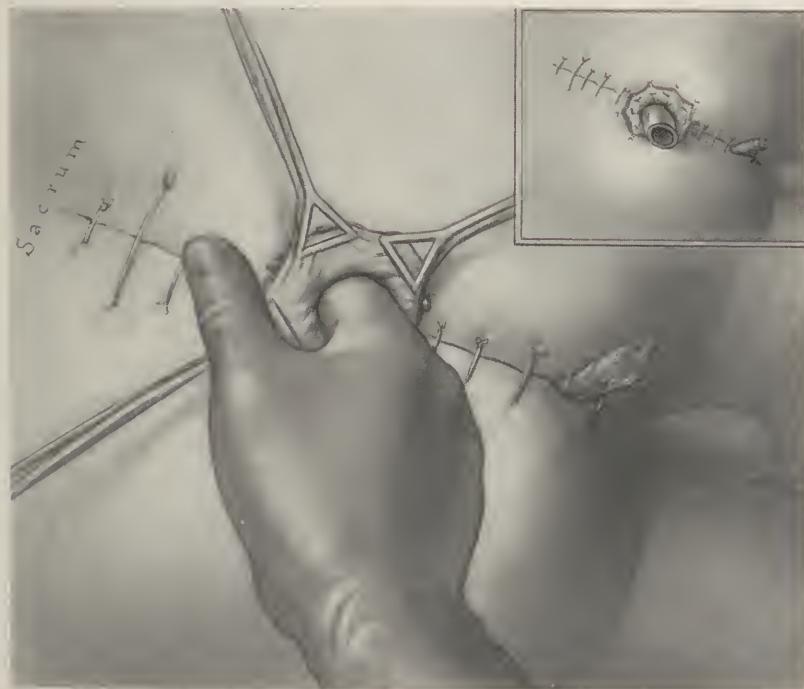


Fig. 627.—Posterior sacral proctectomy. Finger introduced into bowel as wound is closed to insure proper sized sacral anus. Insert shows wound edges approximated with superficial, deep, and retention sutures, manner in which bowel is stitched to the skin, drain, and appearance of rubber tube left in rectum.

Eighth Step.—Dead space is partially obliterated and retraction prevented by suturing intestinal musculature and sacral periosteum on either side with chromicized catgut, or with the author's inflatable bag (Fig. 616) introduced for the purpose.

Final Step.—The wound is closed with interrupted linen or chromic gut, alternating with silkworm-gut retention sutures, except where cigarette drains (Fig. 627) are inserted, following which suitable dressings are applied about the tube (Fig. 619).

Two-stage Operation.—In this procedure the malignant bowel is freed, brought outside, and anchored (Fig. 628) to the skin. Hours or days later this growth is excised and a sacral anus is formed (Fig. 628, insert).

Author's Technic When an Osteo-integumentary Flap is Formed.—The chief claims for this procedure are: it preserves pelvic support through restoration of bony structures, severed ligaments, and muscles, and avoids dividing nerves on both sides of the sacrum.

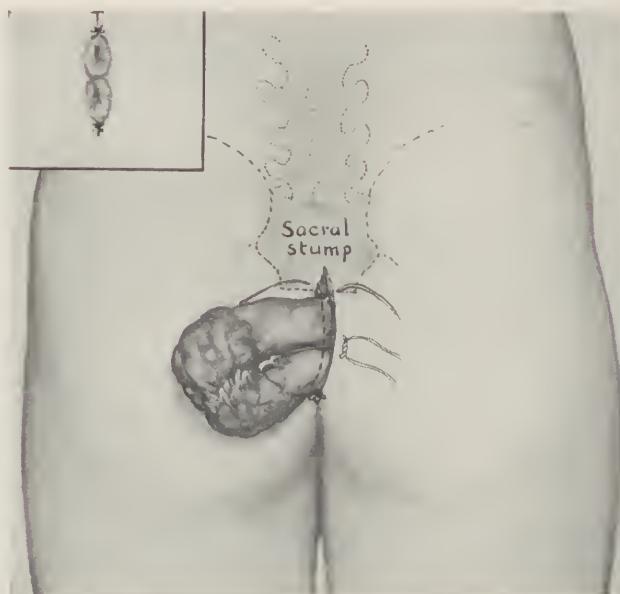


Fig. 628.—Author's two-step proctectomy where in urgent cases the bowel is sutured to the wound and amputated later. Insert shows double-barreled appearance of the sacral anus formed.

Disadvantages of the operation are failure of bony union, sloughing of soft or osseous structures, which occurred in 2 of the author's cases, and complications from imperfect drainage. With few exceptions technic of bone-flap is similar to *sacral excision* operations previously described.

Beginning at or slightly below the upper margin of the third sacral vertebra, an incision is made external to and along the left border of the bone to the coccygeal tip, and from that point downward along the median line to the posterior edge of the sphincter.

This cut is deepened, severing muscles and ligamentous attachments from the left sacrococcygeal border, and the rectum

separated from the lower sacrum and coccyx with scissors or fingers. A second cross incision is made through soft parts over the bone below the third sacral foramen to a point beyond the right border, following which the sacrum is chiseled, sawed, or cut through with bone forceps on this line.

The gut is exposed by deflecting osteo-integumentary flap downward and to the right, where it is retained by a skin suture



Fig. 629.—Posterior sacral proctectomy. Integumentary bone-flap operation when the sphincter is preserved. In this procedure a triangular flap composed of skin, fat, sacrum segment coccyx, and attached structures is mobilized and retracted to one side while the growth is being extirpated, and gut ends anastomosed when the sphincter is preserved or sacrificed. The rubber tube acts as a tractor during operation and drains the bowel subsequently.

(Fig. 629). The rectum is freed on all sides, using the finger, scalpel handle, or scissors, care being exercised to avoid injuring nutrient vessels, bladder, prostate, urethra, or vagina, following which bleeding cavities are temporarily packed with hot compresses.

When the growth is within an inch of the anus *preservation of the sphincter* is unsafe, and the anal extremity of the rectum is

amputated after being freed with cautery, following which the proximal end is anchored at the anal site. The projecting bowel may be left closed, but preferably is opened and the author's drainage-tube inserted, or his inflatable bag (Fig. 616) is introduced to close perirectal dead spaces, stop oozing, and permit escape of feces and gas external to the dressings.

When the growth is high, following mobilization by dissection, incision of the peritoneum and mesorectum, division of lateral

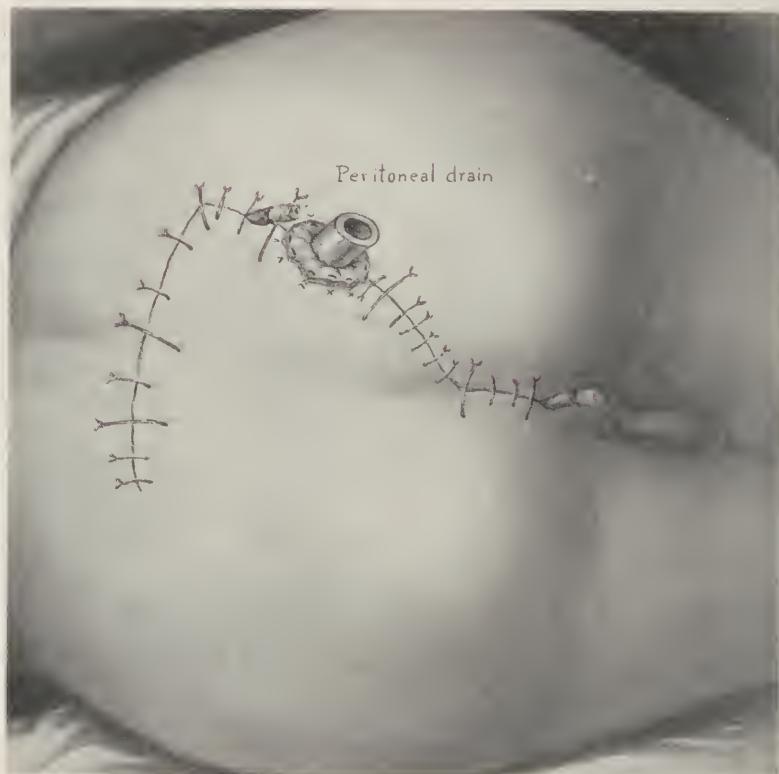


Fig. 630.—Posterior sacral proctectomy. Appearance of the wound at completion of osteointegumentary bone-flap operation when the sphincter is sacrificed.

ligaments, ligation of superior hemorrhoidal artery if necessary, and excision of diseased segments, continuity of the bowel may be re-established by Murphy button or circular enterorrhaphy (Fig. 638); in the absence of tension following crushing or division of the bowel between clamps with cautery, the upper may be drawn through the anus and attached to the perianal skin after the lower segment has been denuded of mucosa, or bowel ends may be

anastomosed outside, following eversion and invagination of the anal stump.

The operation is completed by approximating levator ani muscles (Fig. 639), closing peritoneum (Fig. 639), replacing the osteo-integumentary flap, and closing the wound with chromicized reinforced by silkworm-gut retention stitches (Fig. 630) following introduction of drains at the upper and lower angles of the wound.

Occasionally it is impossible to make an anastomosis or bring the proximal end to the skin, in which case a *sacral* or *coccygeal anus* (Figs. 606, 627) is established by removing a segment of the osteo-



Fig. 631.—Showing postoperative scars and appearance of a satisfactory sacral anus. Position of normal anus indicated by arrow.

integumentary flap, or excising the detached sacrum and coccyx and suturing soft parts about the projecting rectum and contained drainage-tube or bag.

In all extirpation operations where the gut is anastomosed a large rubber tube is introduced into the bowel well above the suture line, the lower end being left long to project beyond and prevent soiling of the dressings (Fig. 641).

When the patient suffers from complete fecal incontinence following the establishment of a sacral anus leakage is prevented with the author's soft-rubber dumbbell bag (Fig. 632, *A*, *B*), or

less satisfactorily with the older and more inconvenient apparatus (Fig. 632, *C*).

Vaginal Proctectomy—Excision.—This is the author's operation of choice in women for the extirpation of rectal cancers involving the lower sigmoid or upper and middle thirds of the rectum, and with it the author has several times removed growths at the recto-sigmoidal juncture, and in 6 instances succeeded in excising from 10 to 16 inches (25.40–40.64 cm.) of gut and suturing the split sphincter about the proximal end.

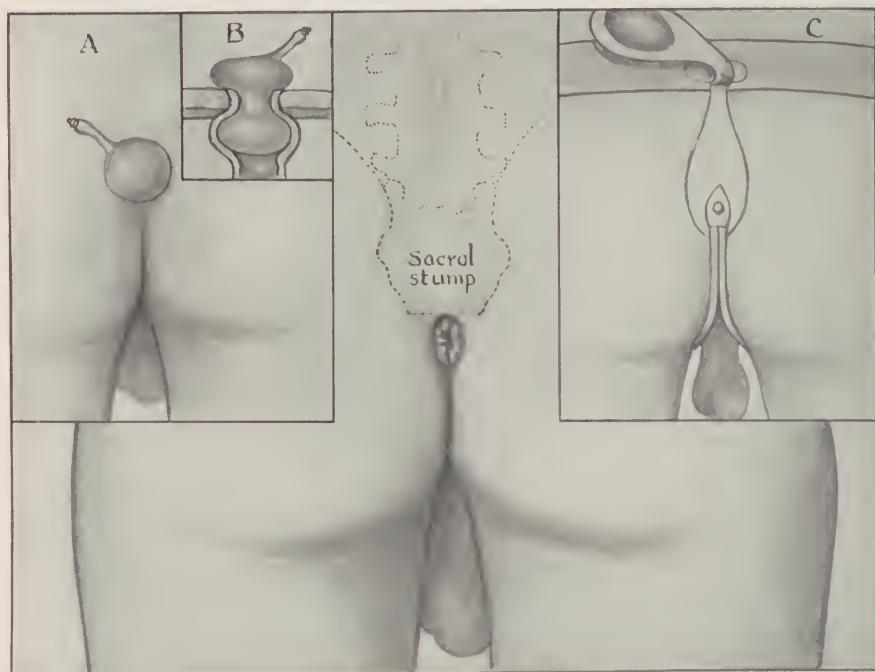


Fig. 632.—Showing relation of sacral anus to bone stump. *A* and *B*, Views of the author's soft-rubber dumbbell bag effective in preventing fecal leakage when incontinence prevails; *C*, cumbersome apparatus formerly employed in this class of cases.

The author has performed vaginal 36 times, with a mortality of 8 per cent., with comparatively few recurrences and complications.

Vaginal is superior to *perineal* and *sacral* extirpation, because it provides abundant room, is less difficult, avoids bony mutilation and weakening pelvic support; peritoneum can be opened in plain view, enabling the operator to easily ligate the superior hemorrhoidal artery, sever the mesorectum, and divide lateral rectal ligaments when mobilizing the bowel; it permits easy isolation of the ureters, facilitates removal of sacral lymph-nodes, allows the

wound to be drained anteriorly and posteriorly, and enables the operator to quickly amputate or resect the gut with or without sacrificing the sphincter.

Author's Technic.—*First Step.*—Having cleansed and swabbed vagina and rectum with surgical iodin or peroxid of hydrogen, the patient is placed in lithotomy position with knees flexed, buttocks elevated and extending over edge of table, the lower rectum is filled

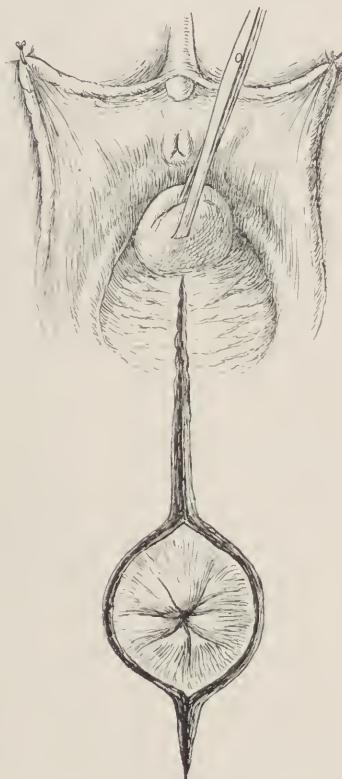


Fig. 633.—Author's vagina proctectomy. Lines of incision when sphincter is sacrificed.

with gauze for easy identification, following which the anus is tightly closed with a strong suture (Fig. 634) or ligature, including detached anal mucosa or perianal skin and the vaginal wall incised.

Second Step.—The labia and cervix are retracted, the split widened, and posterior vaginal wall put on stretch with retractors or large mouse-tooth forceps, and the cervix is caught with volsellum forceps and elevated (Figs. 633, 634).

Third Step.—Beginning at its upper extremity, a median incision is made in the posterior vaginal wall, through the center of

the perineal body, from which point it is carried to within half an inch of the anus when the sphincter is to be preserved (Fig. 634) or made to encircle the anus near the margin when the growth in-

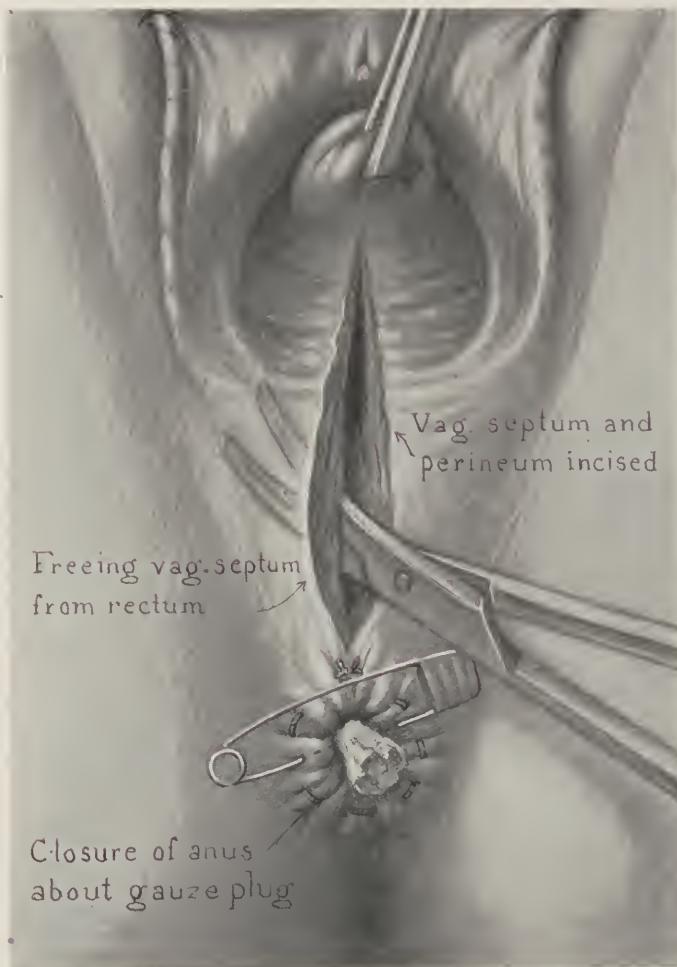


Fig. 634.—Vaginal proctectomy. Author's technic when sphincter is preserved. Anus occluded with gauze purse-string suture and safety-pin, transfixing gauze and perianal skin to prevent leakage. Above is shown rectal and vaginal septums being separated with blunt-pointed scissors.

volves the anal canal and the sphincter cannot be preserved (Figs. 633, 636).

Fourth Step.—With handle of scalpel or blunt scissors the vagina is carefully dissected from the bowel (Fig. 634) so that neither be buttonholed; the rectum between the levator ani

muscle and the peritoneal reflection is freed at the sides, peeled from the sacrum with the finger, working first in one direction,

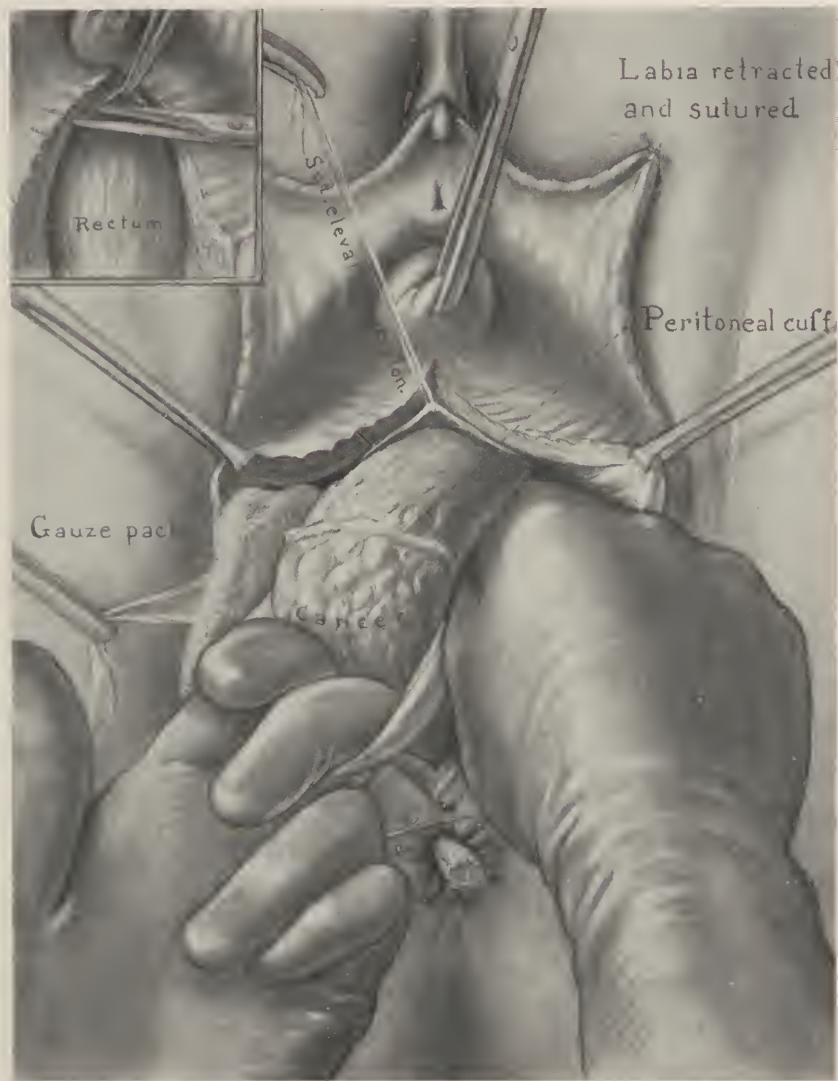


Fig. 635.—Vaginal proctectomy. Author's technic. Cancerous rectum drawn downward to one side by bandage tractor and held while the bowel is being detached from peritoneum, fascia propria, and lateral ligaments with finger dissections and scissors; hemorrhage controlled with hot gauze packs. Insert shows method of separating bowel and peritoneum with forceps and scissors.

then in another (Fig. 635); while bleeding is arrested by suitably placed hot gauze compresses (Fig. 635), the bowel and growth are

inspected and palpated to ascertain if the peritoneum must be incised (Fig. 635), an amputation or resection is indicated, and whether or not the sphincter is to be preserved or sacrificed.

Fifth Step.—The rectum to vicinity of the sphincter is freed from levator ani and other attachments and drawn through the vaginal opening; if not sufficiently mobilized, the peritoneal, mesorectal, and lateral ligamentous attachments are incised and the



Fig. 636.—Vaginal proctectomy. Author's technic. Closed rectum lifted upward with author's steel safety-pin tractor and restraining levator ani muscle being divided with scissors over fingers introduced as guide.

bowel drawn down the desired distance (Fig. 635), and if required the superior hemorrhoidal artery (Fig. 637) is ligated between double ligatures and divided, following which the growth is excised between double ligatures or clamps (Fig. 637) placed at a safe distance above and below it, hemorrhage being controlled by hot packs and ligatures.

Sixth Step.—The peritoneum is sutured to the intestine (Fig. 638) and the proximal gut, into which a Gant tube (Fig. 641) or

bag (Fig. 616) has been introduced, is stitched to the dilated anal segment denuded of mucosa, or sutured to the perianal skin when the lower rectum has been excised and the sphincter split and temporarily turned aside (Fig. 643). When the anal muscle must be sacrificed (Fig. 636), a partially controllable sacral, interischial,

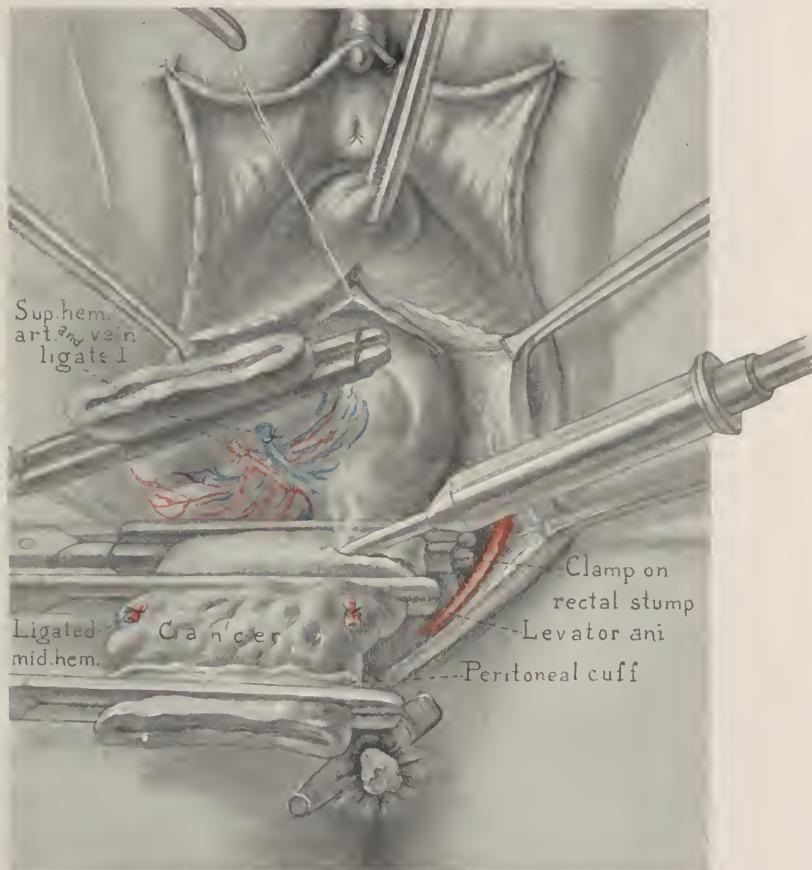


Fig. 637.—Author's technic. Cancerous rectum amputated between forceps with cautery (with or without being crushed) above anus following mobilization and ligation of superior and middle hemorrhoidal vessels. The peritoneum is lifted upward with a ligature.

or vaginal anus is established, dead space having been previously eliminated by resuturing the levator ani muscles (Fig. 638) about the new rectum.

Seventh Step.—Having inserted drains in the upper angle of the wound and in posterior rectal space (Fig. 639), the vaginal cut is closed by interrupted chromicized sutures; the perineal split is

repaired by deep hardened gut and superficial linen or wire stitches (Fig. 639), following which skin and sphincter edges are approximated in like manner.

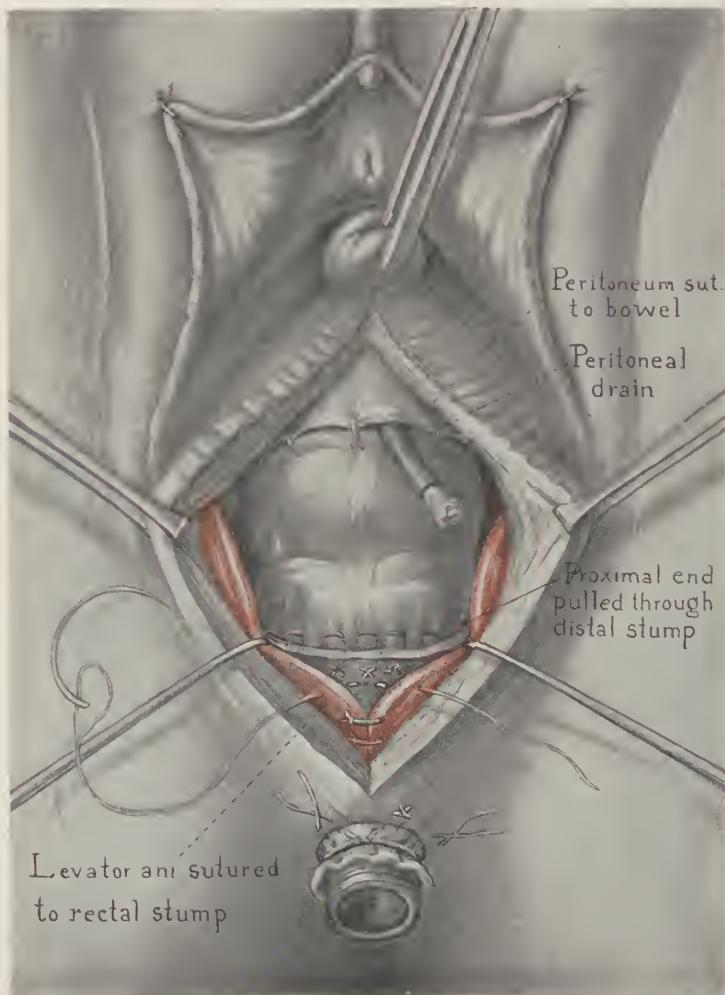


Fig. 638.—Vaginal proctectomy. Author's technic, showing vaginal septum, retracted peritoneum sutured to the bowel, drain inserted proximally, and bowel pulled through (Fig. 607) and sutured to the rectal stump previously denuded of mucosa. Levator ani sutured to and about the bowel to minimize fecal incontinence, intestine ligated about author's hard-rubber rectal tube fitted with a fecal reservoir connection, and attachment of extruded gut to the perianal skin with interrupted linen sutures.

Final Step.—The vagina is cleansed and packed with sterile gauze, the skin and wound painted with iodin, the inflatable bag (Fig. 616) is distended to eliminate dead space and arrest oozing,

or the author's fecal reservoir (Fig. 640) is screwed on to the author's hard-rubber tube (Fig. 641) about which the bowel has been

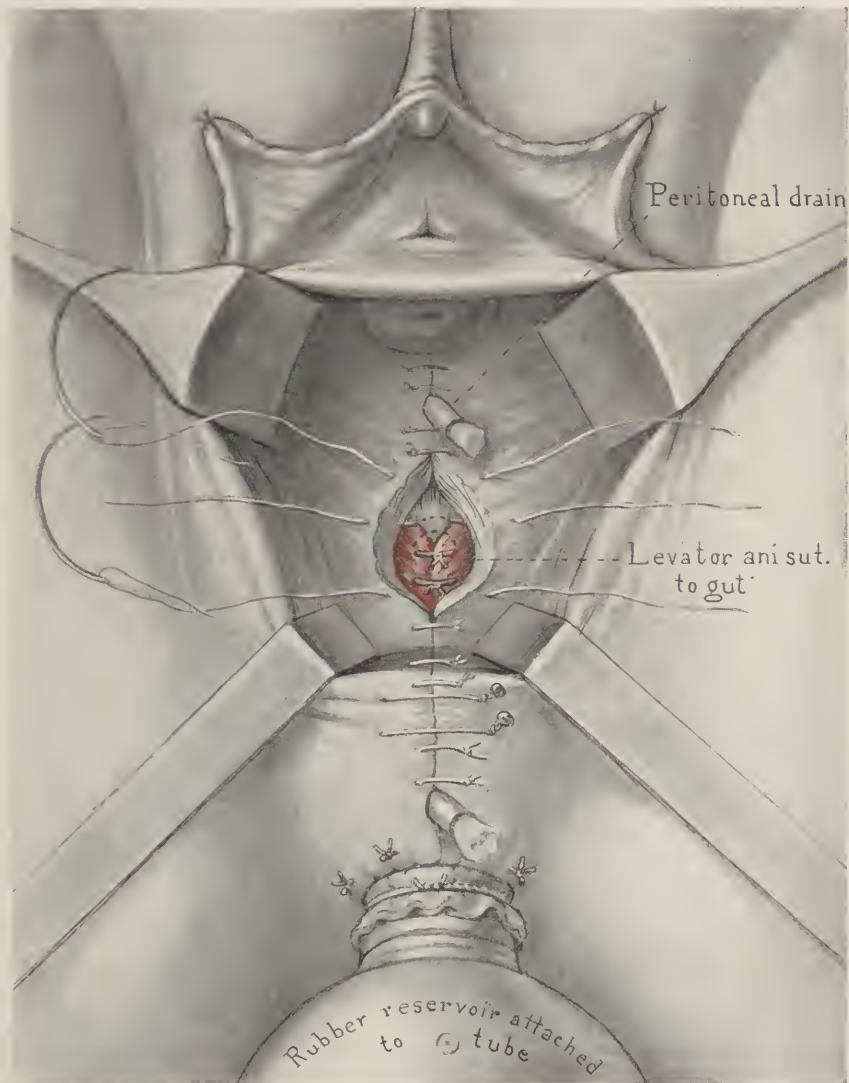


Fig. 639.—Vaginal proctectomy. Author's technic. *Final steps:* Labia retracted, showing attachment of levator ani to new rectum, drains inserted, and wound almost closed with superficial, deep (catgut), and wire retention sutures. Below is seen anchoring sutures and author's fecal reservoir attached to his hard-rubber tube, about which the bowel has been ligated.

ligated, dressings applied and firmly held in place by a broad T-binder.

Abdomino-anal, Abdominoperineal, Abdominosacral, and Abdominovaginal Excision.—These procedures employed in extirpating cancers at the rectosigmoidal juncture or higher are begun through the abdomen and completed by *inferior, superior, or vaginal proctectomy*.

Laparoproctectomy is theoretically ideal and would be the operation of choice were it not for accompanying *high mortality*, which has not greatly decreased, though improvements in technic

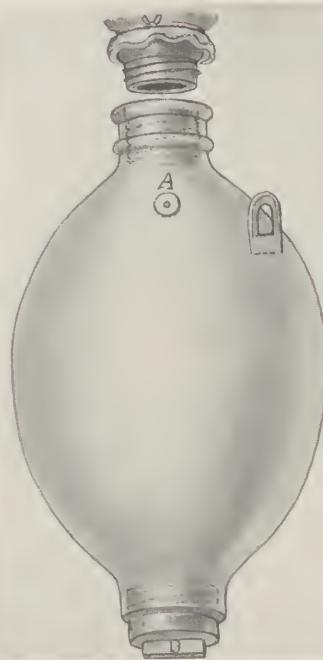


Fig. 640.—Author's soft-rubber fecal reservoir about to be screwed on to the hard-rubber tube around which the bowel has been tied. The reservoir has a vent (A) for the escape of gas, and (B) a screw stopper, which upon removal permits evacuation of contained feces. The bag is easily detached and quickly cleaned.

have been made; this probably because wider operations are being performed in mobilizing the gut and removing glands sometimes up to the inferior mesenteric artery.

Advantages of the combined operation are: (a) It enables the surgeon to explore the abdomen for infected glands and metastases in other organs; (b) remove extensive high growths; (c) establish an artificial anus, bring proximal gut below for anastomosis or suture to the perianal skin; (d) mobilize the gut to avoid tension and sloughing; (e) correct complicating abdominal lesions; (f)

extirpate glands and lymph vessels from the anus to upper descending colon; (g) early expose, ligate, and sever vessels by sight; (h) inspect and avoid injuring ureters, vas deferens, bladder, uterus, prostate, and vagina; (i) prevent bony mutilation that weakens pelvic support; (j) divide perirectal peritoneum without danger to internal iliac vessels; (k) frequently to preserve the sphincter, and (l) lessen the number of recurrences.

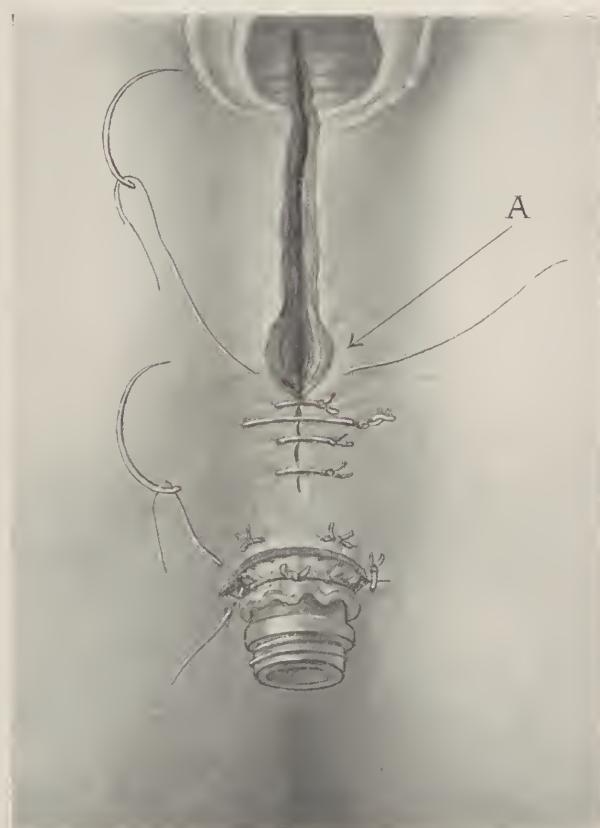


Fig. 641.—Author's vaginal proctectomy. Appearance of the wound during closure when the sphincter is preserved.

Chief objections to this operation are: (a) It is prolonged and difficult; unsuitable for the obese or debilitated, and for patients having serious cardiovascular, lung, or kidney complications, or high-blood pressure; (b) is frequently complicated by shock, peritonitis, suppression of urine, embolism, paralytic ileus, pneumonia, pleurisy, and sloughing of the gut when nutrient vessels

are injured; (c) higher mortality—20 per cent.—than other excisions; (d) difficulty in bringing gut to anus for sphincteric preservation; (e) frequency of fecal fistula at the anastomotic suture line, and (f) an artificial anus is often necessary because anastomosis is impossible, because the gut cannot be brought to the anus owing to difficult mobilization.

Preliminary colostomy in connection with the combined operation is indicated in the presence of obstruction to allow gas distention to subside, accumulated feces to be evacuated, inflammatory exudates to diminish, patient to recuperate, and to lessen danger from infection.

Some surgeons establish a permanent artificial anus when performing abdominoperineal excision, but owing to its disagreeable features the author resorts to colostomy only in exceptional cases where the bowel cannot be sufficiently mobilized, enterorrhaphy is impossible, or the gut cannot be brought down and a normal sacral or interischial anus formed.

Anastomosis of the upper with lower end is best, but impractical when the rectal stump is devoid of peritoneum owing to frequency with which abscess and posterior fecal fistula follow through breaking down of suture line, complications avoided by mobilizing the bowel and forming a *sacral*, *vaginal*, or *interischial* anus, except the sphincter be preserved, when the upper is drawn through the lower extremity previously denuded of mucosa, and attached to the perianal skin (Fig. 607).

Author's Technic.—Steps in abdomino-anal, perineal, and vaginal excision vary in different cases, and it is impossible to outline an operation that could be followed as a *routine* procedure.

First Step.—With preparation of the abdomen and sacro-anal region completed and bowel closed by purse-string suture placed around liberated mucosa or in perianal skin (Fig. 634) the patient is changed to the Trendelenburg posture.

Second Step.—The abdomen is opened by free median or left rectus incision extending from the pubes to well above the umbilicus (Fig. 642), bleeding controlled, wound edges protected by towels or gauze handkerchiefs, the abdomen held open by self-retaining retractors (Fig. 642), is explored for diseased glands, involved organs or other complications, and the bowel lifted upward for inspection and palpation to determine location and extent of growth and character of operation indicated.

Third Step.—The upper rectum and a segment or the entire sigmoid are mobilized by incising mesosigmoidal and rectal peritoneum on either side of the bowel—especially outer side (Fig. 642)—

parallel with and distant to the gut, and wiping it, associated fat, and lymphatics toward median line with gauze, and according to necessity double ligating and dividing the superior hemorrhoidal

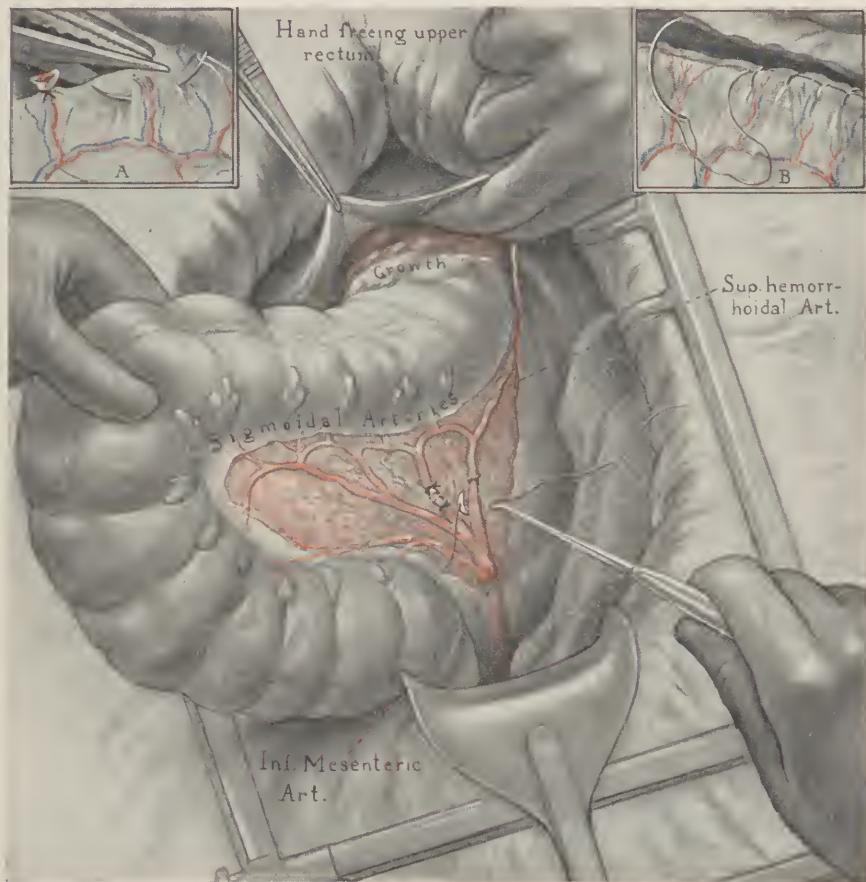


Fig. 642.—Author's technic of abdominoperineal proctectomy—combined operation. The sigmoid flexure is brought outside through a long medium, left rectus or Kammerer incision retracted and mobilized by slitting the outer peritoneal leaf of the mesentery, ligating and dividing the superior hemorrhoidal and sigmoidal arteries. Above is shown the growth, peritoneum incised, and lifted up with forceps, and the rectum being freed with fingers introduced from above. Insert A: Method of controlling hemorrhage by ligating and dividing the mesentery in segments when large vessels are not tied at their source. Insert B: Method of controlling hemorrhage by whipping over cut mesentery with lock-stitch when main vessels are ligated at their source.

(Fig. 642), lower sigmoidal (Fig. 642), or inferior mesenteric artery, which is immediately followed by straightening out of sigmoid flexure and loosening of the upper rectum.

Fourth Step.—Having defined and protected the ureters, vas

deferens, and the iliac vessels—which seldom require ligation—the sigmoid and bladder or uterus—if necessary—are lifted upward, bringing pelvic peritoneum into view, which is severed from the bowel by a circumferential incision (Fig. 642), using catch forceps and scissors.

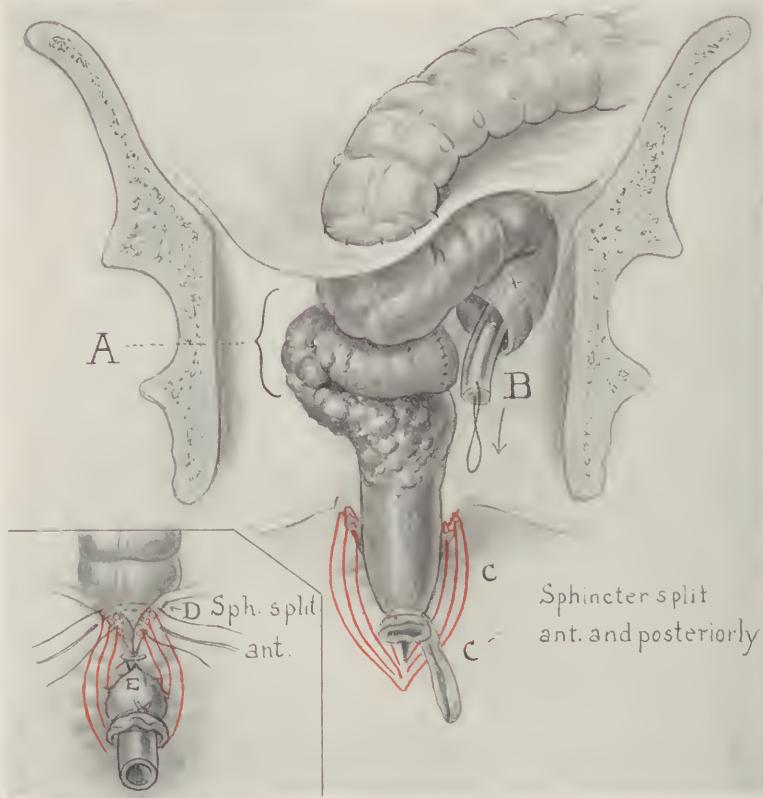


Fig. 643.—Author's technic of abdominoperineal proctectomy—combined operation, where the sphincter is preserved. The bowel has been mobilized, divided, and a tube (B) introduced into the proximal end and the distal segment (A) closed, when both are pushed down into the pelvis and peritoneum is closed over them. The cancer is extirpated by perineal proctectomy and the healthy bowel brought down to the anus, when (C), the previously split sphincter and skin, are sutured about it. Insert shows method of (D) suturing the sphincter when the anal muscle is split in front only, and (E) the sutured bowel, ligated about a rubber drainage-tube, is left extruding a considerable distance beyond the anus to minimize the danger of infection.

Fifth Step.—Having severed the middle sacral artery between ligatures, the rectum is freed to the levator ani by peeling it, vessels, and glands from the sacrum, dividing lateral rectal ligaments and fascia with scissors, and separating it from uterus and vagina or bladder and prostate with fingers or scalpel handle; following which

oozing is controlled by hot packs, the mobilized bowel is pushed deep down into the pelvis, and the peritoneum is drawn upward and attached to the intestinal serosa by interrupted catgut sutures (Fig. 638), a procedure that insures drainage and prevents hernia of the small intestine without constricting the bowel.

Sixth Step.—Rents in the mesosigmoid and peritoneum elsewhere are sutured, the abdominal wound is closed in the usual way, suitable dressings applied, and patient changed to the exaggerated lithotomy or Sims' position.

Seventh Step.—According to indications, the growth and adjacent bowel are removed by *inferior*, *superior*, or *vaginal* proctectomy after the manner previously described; following which continuity of the intestine is restored by anastomosing proximal and distal ends with Murphy's button or sutures alone; when resection is not feasible and the rectum is amputated, the proximal end of

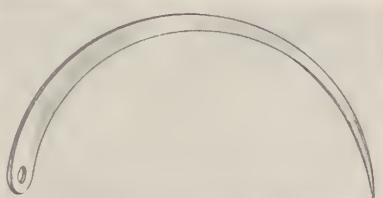


Fig. 644.—Author's needle, useful in proctectomy, hemorrhoidal, procidentia, and other extensive anorectal operations. The needle has a rounded point which seldom injures blood-vessels, and a flat broad upper extremity, which enables the operator to employ it without a needle-holder.

bowel is brought out to form a sacral anus (Fig. 627), or drawn through the split sphincter (Fig. 643) and sutured to the anal skin when the sphincter is preserved. The closed gut may be left protruding beyond the anus, or a large rubber tube may be introduced into the new rectum and dressings applied about it, or the author's fecal reservoir (Fig. 614) or his inflatable bag and attachment (Fig. 615) may be employed as in other operations.

Two-stage Resection.—Depending on the location and size of the neoplasm it may be removed through the abdominal incision or by way of the rectum, or when the patient's condition is critical—as in 2 of the author's cases—be brought outside and the gut sutured to the abdominal skin, the neoplasm being amputated and continuity of gut restored at a later date—*two-stage operation* (Fig. 1070, A, B).

The *two-stage* operation is varied in less acute cases by dividing the mobilized gut and forming an artificial anus with the *upper*

(Fig. 645, A), and closing and dropping the lower end with tumor into the abdomen, or closing the peritoneum over it (Fig. 645, B), leaving rectal extirpation for a future time.

To facilitate anastomosis and protect the suture line a large firm rubber tube is inserted and anchored in the proximal end by



Fig. 645.—Author's technic of abdominoperineal—combined operation—with colostomy. Following mobilization of the sigmoid shown in the preceding illustration the bowel is clamped and divided with cautery, following which the proximal is brought out through A, subcutaneous tunnel, and sutured to skin edges of a second incision, and a rubber tube introduced to provide drainage. When abdominal wound is then closed by the layer method and dressings applied. After the patient has been placed in the left Sims' lithotomy posture the distal end of the bowel (B), which has been closed, pushed downward, and the peritoneum closed over it, is quickly extirpated (with or without the sphincter) by perineal, vaginal or sacral proctectomy, the upper and middle rectum having already been freed by dissection made from above.

catgut stitches, then pushed through the rectal stump and traction made upon it (Fig. 643) to approximate and hold together the gut ends until they have been sutured—Balfour-Mayo-Coffey technic.

When the *pull-through* method (Fig. 607) is employed traction sutures (Fig. 607) are not always reliable, and the author

ligates the bowel about his special retractor (Fig. 611) and draws it down and through the divulsed anus, where it is retained until sutured to the skin. The bowel is retracted in a similar manner where it is to be sutured to the *rectal stump previously invaginated and everted by forceps or ligatures.*

In case colostomy is decided upon, plans discussed elsewhere—Chapter XCIV—for establishing a controllable anus are followed, and to minimize danger from infection the gut is left closed for one or two days; in presence of acute obstruction it is opened and firmly

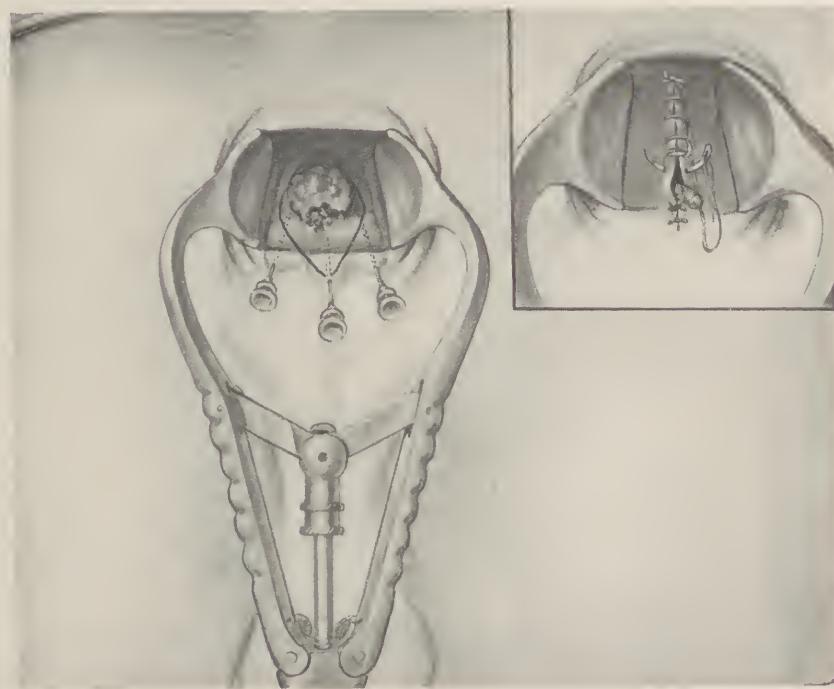


Fig. 646.—Removal of early carcinoma by partial excision under anesthesia.

ligated about the author's special or thick rubber tube, which extends through the dressings, permitting immediate escape of gas and feces without their infecting the wound.

The combined operation is invariably accompanied by from slight to serious shock, which in debilitated patients is minimized by employing a saline hypodermoclysis.

Abdominal Proctectomy and Sigmoidectomy (see Chapter XCII).—It is questionable if *rectal* cancers are ever removable through the abdomen, but growths involving the lower sigmoid and possibly the rectosigmoidal juncture are sometimes extirpated in

this manner independently or with colostomy; the operation is tedious and difficult, because most of the work is done blindly deep down in the pelvis.

On the contrary, neoplasms involving the colon and upper sigmoid are easily extirpated, and continuity of the bowel restored by end-to-end anastomosis, using a Murphy button or, preferably, through-and-through reinforced by linen Lambert sutures. Mobilization, by dividing the outer peritoneal layer of the mesosigmoid and ligation of arteries, is required when the neoplasm is extensive or the mesocolon short, but are usually unnecessary because the gut is freely movable or the cancer is of the annular type, involving only a short segment of bowel.

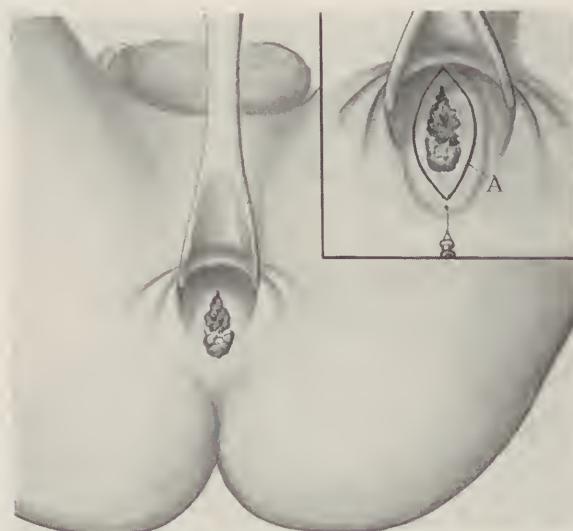


Fig. 647.—Anal epithelioma originating in a corn-like tumor that ulcerated and was rapidly destroying adjacent structures when removed by (A) through an elliptic incision made under local anesthesia.

The author's mortality in resections made for growths affecting the sigmoid or rectosigmoidal juncture was 20 against 15 per cent. for similar operations—colectomies—involving other segments of the large intestine.

An artificial anus is unnecessary in the treatment of colonic and sigmoidal cancer unless the growth is inoperable, or a two-stage operation is necessary to save patients suffering from acute obstruction.

Partial Proctectomy—Excision.—In hundreds of rectal cancer operations the author has performed local or partial excision

(Fig. 646) only 3 times; because of early recurrence in each instance the operation, which was never practised except for small localized incipient rectal growth, has been abandoned.

Anal Proctectomy—Excision.—This procedure is seldom indicated because it is performed only for *epitheliomata*, which represent approximately 5 per cent. of anorectal cancers, and further, because this form of malignancy frequently attacks the terminal rectum, in which case *perineal* is preferable to *anal proctectomy*.

The author has extirpated three perianal epitheliomata by lengthy, wide, deep elliptic incisions (Fig. 447, A), the wound being approximated by sutures, or left open to heal by granulation. There was no mortality from the operation and but two recurrences.

Formerly the author extirpated anorectal cancers that *extensively involved the skin and neighboring structures*, but mortality was high and recurrences so early and frequent that he now seldom performs a radical operation in this class of cases, and relies on *x-rays*, *radium*, or *caustic paste treatment reinforced by anodynes* to relieve pain and procure sleep.

Diathermy works well in some instances, but burning extensive epitheliomatous ulcers and nodules with the *cautery* does no good and usually hastens the growth of cancers.

Chapter LIX

Anatomy of the Small and Large Intestine

Small Intestine.—The small bowel (Fig. 650), which lies between the pylorus and ileocecal valve, is composed of three segments—the *duodenum*—10 to 12 inches (25.40–30.48 cm.); *jejunum*

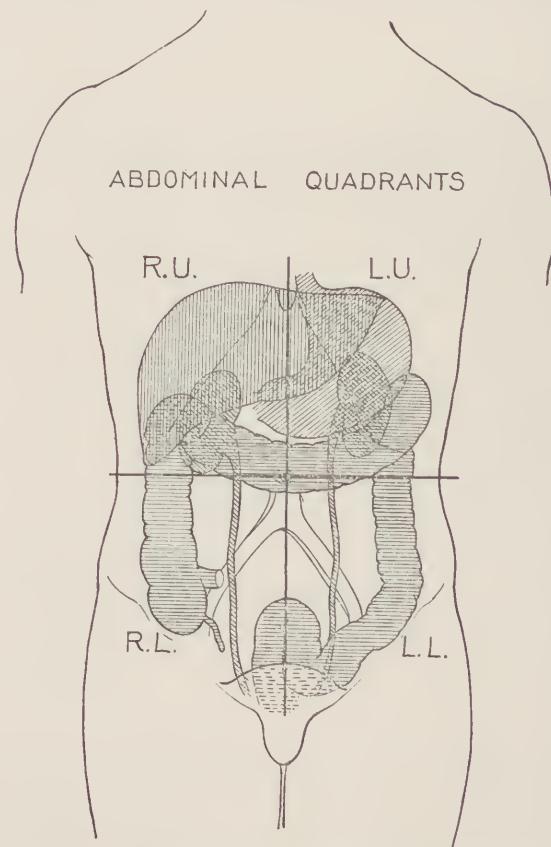


Fig. 648.—Showing the relation of abdominal organs.

—about two-fifths, and *ileum*—three-fifths, and possesses *serous*, *muscular*, *submucous*, and *mucous* tunics.

The chief anatomic features of the mucosa are the *valvulae conniventes*, which provide an extensive surface for absorption:

villi, simple follicles, duodenal, and lymph-glands, solitary Peyer's patches.

Large Intestine.—The large bowel—colon (Fig. 650)—which extends from the ileocecal valve to the anus, is 5 or 6 feet (1.5–9.8 meters) in length, is largest at the cecal end— $3\frac{1}{2}$ inches (8.89 cm.)—smallest at the rectosigmoidal juncture— $1\frac{1}{2}$ inches (3.81 cm.) or less—and surrounds the small intestine in a semicircle. The *large* is differentiated from the *small* gut by its pearl gray color,

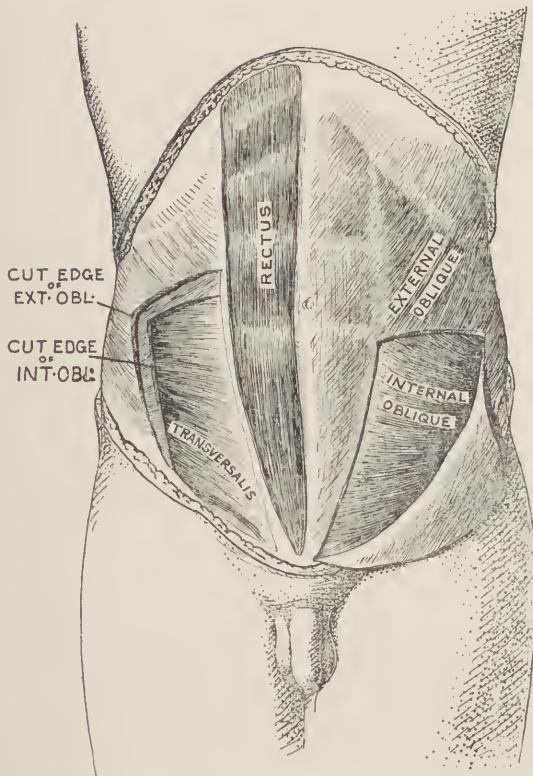


Fig. 649.—Showing the relation of abdominal muscles.

shorter length, larger size, greater thickness, sacculations, longitudinal bands, appendices epiploicæ, and more constant and fixed position, and is composed of the colon and rectum.

Colon.—The colon is subdivided into the *cecum, ascending colon, transverse colon, descending colon, and sigmoid flexure*, but the dividing line between different segments is not always easy to determine.

Cecum—Caput Coli.—The cecum (Fig. 653), or beginning of

the large bowel, which lies in the right iliac fossa above Poupart's ligament below and to the outer side of the ileocecal valve, is conical

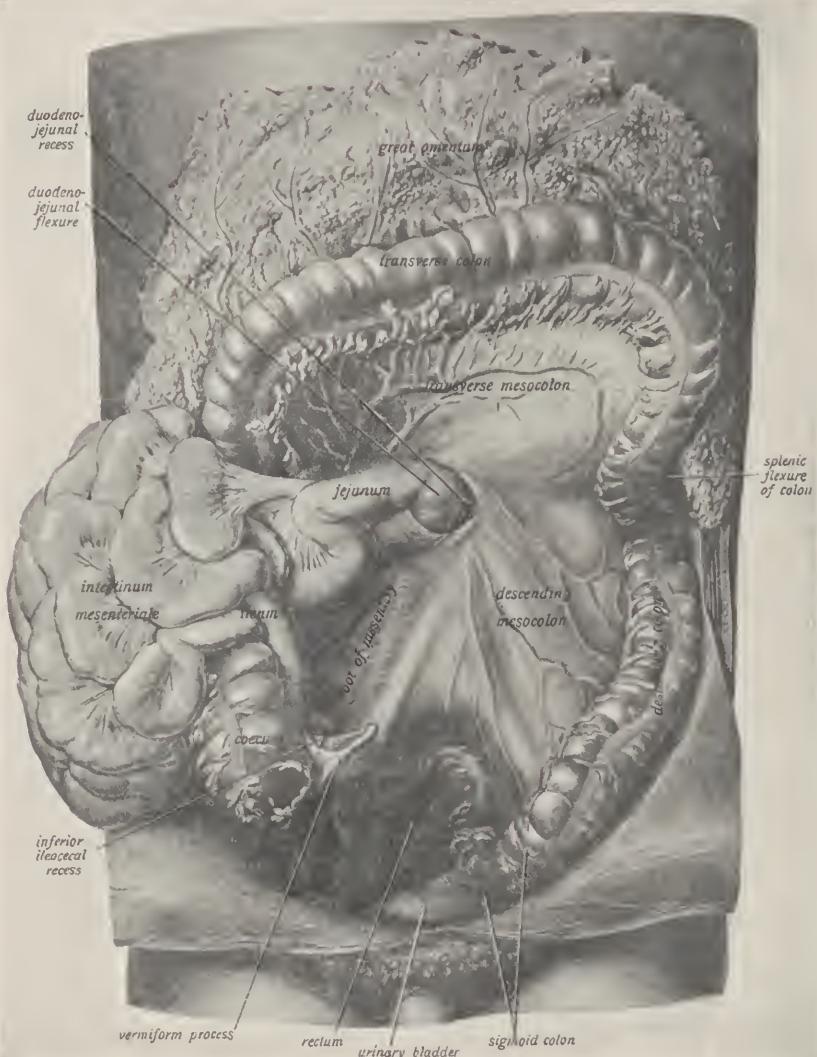


Fig. 650.—View of the abdominal viscera from in front, the great omentum having been drawn upward and the small intestine displaced toward the right. A sound has been introduced into the duodenojejunal recess. (Sobotta and McMurrich's Anatomy.)

in shape, about as long as broad—3 inches (7.62 cm.)—and separated from the ascending colon by a deep semicircular groove. It is subject to change in size and position, particularly when ptotic

or distended, has frequently been found resting upon the bladder, rectum, and left side of the pelvis, due to a lengthy *mesocecum*, and in undescended *non-rotated* cases has been discovered near the gall-bladder.

There are three *pericecal fossæ* formed by peritoneal reflections, the *ileocolic*, *ileocecal*, and the *retrocecal*, in which the appendix is frequently concealed. The interior of the cecum is irregular in appearance, caused by semilunar folds and depressions—*haustra*—



Fig. 651.—Radiograph showing the normal colon of a normal individual. (Radiograph by Cole.)

and is marked by three openings, varying in size: *large*, leading to the ascending colon; *medium*, at the ileocecal valve, and *appendical*, which is small. The cecum is composed of four coats—*mucous*, *submucous*, *muscular*, and *serous*.

Ileocecal—Bauhin's—Valve.—This valve (Fig. 653), located at the juncture of the small and large intestine where the lower ileum invaginates into the caput coli, is formed by the *upper—colic*—and *lower—cecal*—semilunar lips, composed of reduplication of

the mucosa supported by circular muscle-fibers which coalesce at the angles of the *enterocecal* opening—valve.

The purpose of the ileocecal valve is to prevent escape of chyme into the large intestine before it is properly prepared and guard against regurgitation of feces from the colon back into the ileum. Leakage upward or downward ensues when the valve is incompetent (Fig. 849), fatigued, diseased, or abnormal pressure is exerted upon it by tumor, gas, or fecal distention, bismuth, barium, or other high enemas (Fig. 850).



Fig. 652.—Appearance of colon artificially distended with air, radiograph taken following barium meal: *X* indicates anal dilator inserted to retain the air.

Vermiform Appendix.—The appendix (Fig. 653), which projects from the inner posterior cecal wall where longitudinal band become confluent, about 1 inch (2.54 cm.) below the ileocecal valve, is a firm, long, narrow mucomuscular tube about $3\frac{3}{4}$ inches (9.53 cm.) in length and $\frac{1}{4}$ inch (6.35 mm.) in diameter. It may be absent, thick or short, long and worm-like, or strictured, and be encountered upward and behind or in front of the cecum, wrapped around the small intestine or deep in the pelvis. The appendical canal, which is about the size of an ordinary probe, opens into the inner and posterior surface of the cecum below the ileocecal juncture and frequently contains fecoliths, seeds, and other small foreign bodies. The appendix is composed of four tunics, *serous*, *muscular*,

submucous, and *mucous*, and obtains its blood-supply from the posterior cecal and appendicular arteries; the main branch of the latter passing to the meso-appendix (Fig. 660).

Ascending Colon.—This segment of large intestine (Fig. 654), 8 inches (20.32 cm.) in length, extends vertically from the cecal frenulum to the margin of the gall-bladder and concavity of the liver, where it turns sharply, forming the *hepatic flexure*. It is in close relation with the abdominal parietes in front, back, and at

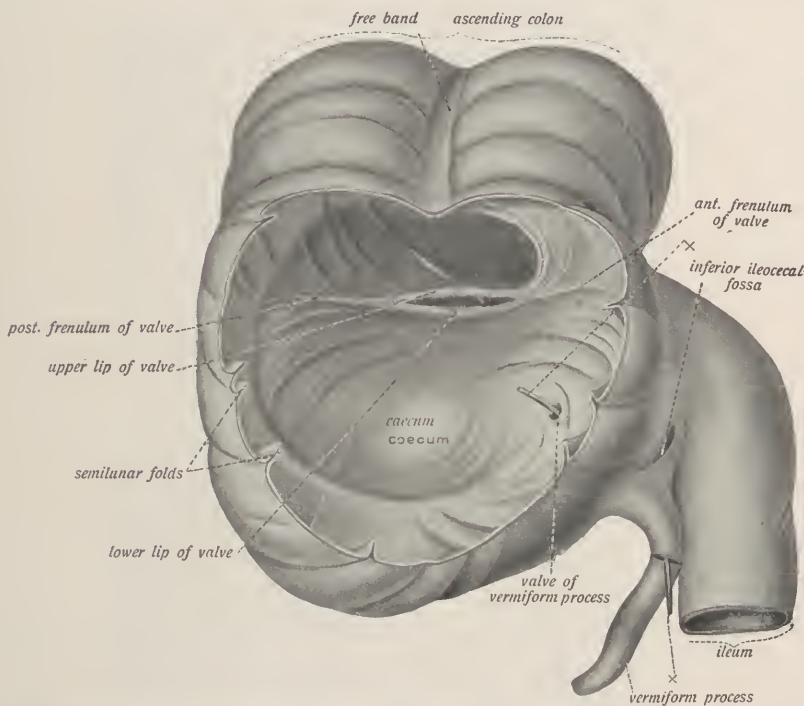


Fig. 653.—Showing important structures of the cecum and its relation to the appendix and small intestine. (Sobotta and McMurrich's Anatomy.)

the side, kidney, transversalis and quadratus lumborum muscles, and has a lateral and anterior peritoneal reflection which supports it.

The **transverse colon** (Fig. 654), which extends across the abdomen beneath the liver and gall-bladder, from the *hepatic* to the *splenic flexure*, is arched upward and backward, and is in relation with the spleen, small intestine, great omentum, and anterior abdominal wall. This is the most movable and longest segment of large intestine, being 20 inches (50.80 cm.) in length, and is almost completely covered by peritoneum, the duplication of which—

transverse mesocolon—is broad, long, and anchors the gut to the posterior parietes.

The descending colon (Fig. 654), which is smaller and more deeply seated than the ascending, passes downward on the left side along the outer border of the kidney and psoas muscle, where it becomes continuous with the sigmoid flexure. It is $8\frac{1}{2}$ inches (21.59 cm.) in length and supported by the diaphragm, phrenocolic ligament and serosa covering its anterior and lateral surface.



Fig. 654.—Radiograph of the large intestine and sigmoid flexure: *C*, Cecum; *H. F.*, hepatic flexure; *T. C.*, transverse colon; *S. F.*, splenic flexure; *D. C.*, descending colon; *S*, sigmoid flexure. (Radiographed at Broad Street Hospital.)

Sigmoid Flexure—Pelvic Colon.—This irregular S-shaped segment of large intestine (Fig. 654), lying in the left iliac fossa, is called the sigmoid flexure because of its curves—*omega* loops. It is the narrowest part of the colon, begins at the termination of the descending colon at the border of the psoas muscle near the crest of the ileum, and terminates at the rectosigmoidal juncture opposite the center of the third sacral vertebra. Beginning on a level with the iliac crest, it in turn travels across the psoas magnus muscle down into and across the true pelvis, upward over the right pelvic

rim, where it makes a short oval turn and passes backward, inward, and downward to join the rectum at the third sacral vertebra or ending of the *serosal covering and colonic mesocolon*. The pelvic colon is almost entirely surrounded by peritoneum and is attached to the posterior parietes by the long mesosigmoid, which permits a greater degree of mobility than other colonic segments possess.

The average length of the sigmoid flexure is 18 inches (46 cm.), but this includes what was formerly regarded as the upper third of the rectum, which recently has been added to the sigmoid colon, owing to its having a peritoneal covering and mesocolon. The author has observed the sigmoid abnormally long or short many times, has encountered this colonic segment in all parts of the

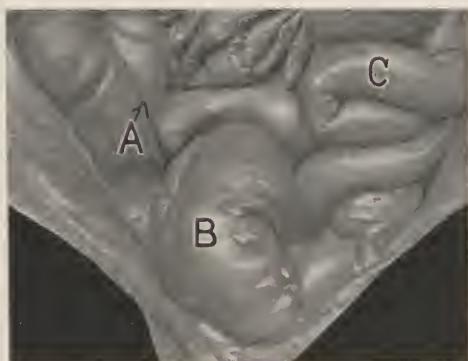


Fig. 655.—Relation of the cecum (A), sigmoid flexure (B), and small intestine (C) when distended with air.

abdomen (Fig. 659), and has often observed it so distorted by disease that it was difficult to recognize.

When empty the pelvic colon lies in the left iliac fossa or pelvis, but as it becomes distended it rolls upward and to the right of the median line, where it remains until gas or feces escape into the terminal bowel. Normally, it is in close relation to the posterior abdominal wall, iliac and psoas muscles, iliac vessels, small intestine, pelvic organs, sacral promontory, and rectum, but when unduly long, displaced or transposed, it comes in contact with other abdominal viscera.

Intersigmoid Fossa.—This is the funnel-shaped opening (Fig. 656), variable in size, located at the left of the median line near the iliac vessels and mesosigmoidal attachment. The aperture is readily exposed by lifting the sigmoid flexure upward and to the left (Fig. 656).

The *rectosigmoidal juncture* (Figs. 657, 658), the narrowest part of the colon, is characterized by a band of involuntary circular

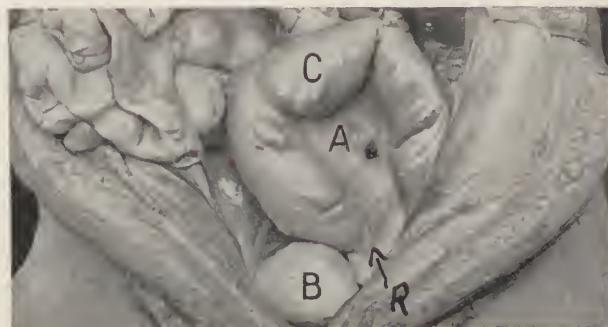


Fig. 656.—Distended sigmoid flexure—pelvic colon (C) retracted to show the sigmoid fossa (A), bladder (B), and rectosigmoidal junction (R).

muscle-fibers known as O'Beirne's sphincter (Fig. 658). This muscle and the sharp angulation formed by bending downward and backward of the sigmoid (Fig. 657) retards the discharge of



Fig. 657.—Paraffin-injected rectum and sigmoid showing angulated rectosigmoidal juncture, bowel curves, mesentery, bladder, and rectovesical peritoneal reflection.

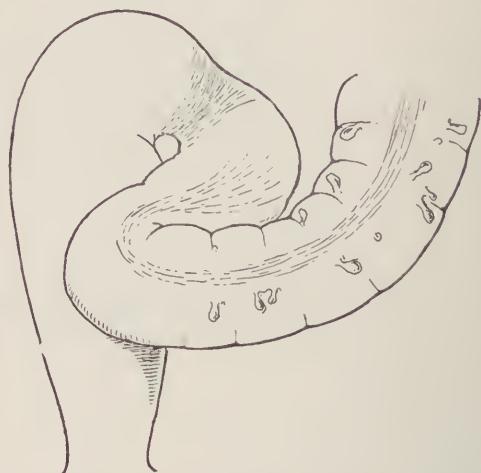


Fig. 658.—Relation of sigmoid flexure and rectum. Dotted lines at rectosigmoidal juncture indicate location of O'Beirne's sphincter. Flexure of the sigmoid is shown above this point.

feces from the sigmoid flexure, and adds greatly to the difficulty of introducing the sigmoidoscope.

Appendices epiploicae, absent in children and pronounced in

adults, are fat-filled peritoneal sacs, varying from pea to pigeon-egg size, attached near the longitudinal bands of the colon; they are of no surgical importance except as a factor in the production of diverticula (Fig. 793).

Structure of the Colon.—The tunics comprising all colonic segments are the same—*serous, muscular, submucous, and mucous*.

Serosa covers the colon except over small areas at the posterior surface of the cecum, ascending and descending colons at the great omentum, and mesocolonic attachments. Peritoneum envelops the sigmoid, barring a small space at the mesocolonic insertion.

The *muscular coat* is composed of an outer *longitudinal* and inner *circular* layer, the former being distributed over the colonic

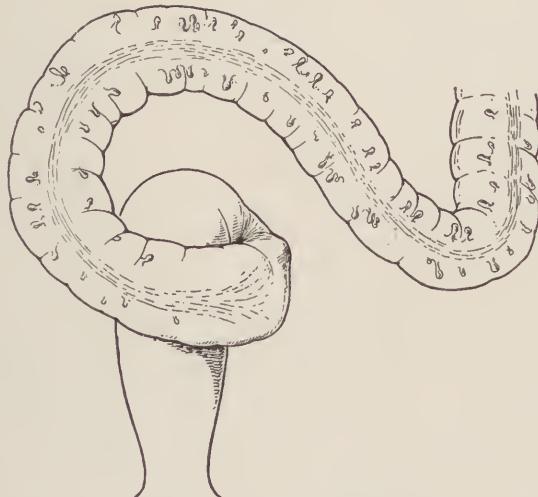


Fig. 659.—Sharp angulation at the rectosigmoidal juncture caused by dropping of redundant sigmoid flexure over and into the right side of the pelvis. Note appendices epiploicae on the colon and sigmoid.

surface, but at certain points form white, glistening, ribbon-like longitudinal bands that end above at the cecum and below at the upper extremity of the rectum, where they first branch out and then disappear.

There are three *longitudinal bands* $\frac{1}{2}$ inch (12.70 mm.) in width equidistant apart, located anteriorly and at the sides of the colon. The longitudinal bands, owing to their being shorter than other colonic tunics, are responsible for *sacculations* observed in the bowel, which disappear when they are severed.

Circular muscle-fibers are more abundant in some than other parts of the large intestine, being very pronounced at the recto-

sigmoidal juncture, where they form a ring-like muscle known as *O'Beirne's sphincter*.

The *submucous coat*—areolar—connects muscular and mucous tunics and forms a bed in which are found arteries, veins, nerves, and lymphatics.

Mucous membrane differs from that of the small intestine in that it is paler, smoother, and has circular ridges—*semilunar folds*—at the dividing line between sacculations. Colonic mucosa is devoid of *villi*, but possesses numerous follicles that give it a *cribriform* appearance, the crypts of *Lieberkühn* are more numerous and longer than in the small gut, while *solitary glands* are less abundant, though more numerous in the appendix and cecum.

Blood-supply of the Colon and Sigmoid Flexure.—The large intestine, excepting the sigmoid flexure and rectum, derives its blood-supply from the *ileo, right, middle, and left colic arteries*, of which the former come from the *superior*, and the latter from the *inferior mesenteric arteries* (Fig. 660).

The *ileocolic artery* (Fig. 660) is of considerable surgical importance, since it supplies the ascending colon, cecum, and lower ileum, and because it inosculates above with the right colic and with the *vasa intestinæ tenuis* below, and the *ileo* lies in the mesentery, while the *right colic* is in contact with the posterior abdominal parietes behind the peritoneum.

The *right colic artery* (Fig. 660) distributes blood to the segment of ascending colon not reached by tributaries of the middle or ileocolic vessels.

The *middle colic artery* (Fig. 660), a branch of the superior mesenteric lying in the transverse mesocolon, is readily exposed by lifting the great omentum and colon upward. It is the main source of nourishment to the transverse colon, inosculates on either side with the right and left colic arteries, and prevents sloughing of the descending colon and sigmoid when the inferior mesenteric, left colic, and sigmoidal arteries have been ligated and severed to facilitate mobilization of the gut in cancer resections involving the large intestine.

Inferior Mesenteric Artery (Fig. 660).—This is the most important vessel, because it or its branches require ligating in sigmoidal resection and rectal extirpation to control hemorrhage, mobilize the gut, and permit infected glands to be widely removed. It arises from the aorta above its division into the iliacs, descends to the left iliac fossa, from whence, as the *superior hemorrhoidal artery* (Fig. 660), it passes along the mesosigmoid to the rectum.

The *left colic artery* (Fig. 660), from the inferior mesenteric,

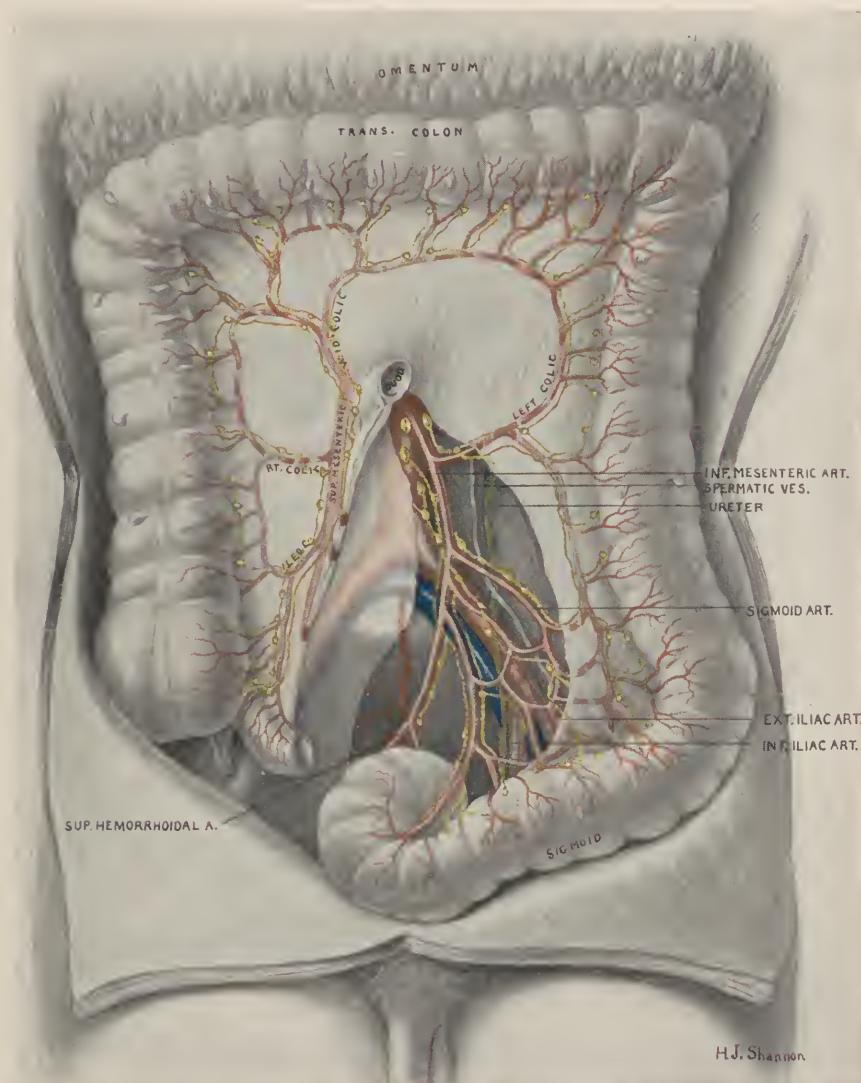


Fig. 660.—Showing topography of colon, sigmoid flexure, upper rectum, and arterial, venous, and lymphatic systems as related to the large intestine. Note loop-like arrangement of vessels and accompanying lymphatics connecting large arteries with different colonic segments, an understanding of which is necessary when excising all or a segment of the colon for cancer.

passes behind the peritoneum to the descending colon, where it branches, one twig inosculates with the middle and the other

sigmoid arteries, helping to form the mesenteric arches of the transverse, descending, and sigmoid colons.

The *sigmoid arteries* (Fig. 660)—1 to 3—derivations of the inferior mesenteric, course obliquely across the psoas muscle to vicinity of the sigmoid flexure, where they anastomose above with the left colic and below with the superior hemorrhoidal artery.

Nerve Supply of the Colon and Sigmoid Flexure.—The nerve supply of the large intestine is derived from both the *sympathetic*



Fig. 661.—Small intestine and sigmoid flexure retracted to show (V) iliac vessels toward which the arrow is pointing.

and *cerebrospinal* systems. The *former*, through the inferior mesenteric and hypogastric plexus, has an *inhibitory* action upon the intestinal musculature, and branches from the ganglia pass with arterioles to the intestinal musculature and unite with the fibers of the cerebrospinal system to form *Auerbach's* and *Meissner's plexuses*, located between the colonic tunics.

The *sigmoid colon* is supplied chiefly by branches from the sympathetic system, but posteriorly receives sensory nerve filaments from the lumbar and sacral plexus. The cerebrospinal

nerves pass the inferior mesenteric ganglia, and the second and third sacral nerves, which go to the hypogastric plexus. Both sets thus reach the bowel indirectly through the sympathetic plexus and serve to enhance peristaltic activity.

The splanchnic nerves, which inhibit the action of the intestinal musculature, produce an opposite but corollary effect upon the ileocecal valve, which they stimulate to contract.

Lymphatics of the Colon and Sigmoid Flexure.—Lymphatic glands and vessels are closely associated with main arteries, and because of this chains of glands draining the colon and sigmoid are designated as the *ileocolic*, *right*, *middle*, and *left colic*, *inferior mesenteric*, *sigmoidal*, and *superior hemorrhoidal* (Figs. 24, 660).

These lymph-nodes are of variable size, single, or in groups, and are encountered at the base of the appendices epiploicæ—*epicolic*—upon vascular arches—arterioles—*pericolic*, midway between arcades and larger vessels, *intermediary* and at the origin of main arteries—*main group glands* (Fig. 660).

A knowledge of gland groups is essential, for the removal of one or all may be necessary when resecting the colon, sigmoid, or rectum for cancer, if recurrence is to be avoided. Their elimination is facilitated by dividing peritoneal attachments on the outer side and lifting the bowel upward and inward, so glands and surrounding fat may be wiped away with gauze.

The *ileocolic* and *ileocecal* lymphatic chains drain the lower ileum, cecum, and appendix; the *right colic*, the ascending colon; the *middle colic*, the upper third of the ascending and right half of the transverse colon; the *left colic*, the left half of the transverse colon, splenic flexure, and descending colon, and the *inferior mesenteric* and *superior hemorrhoidal* chains of lymphatics constitute the chief source of drainage for the sigmoid flexure and upper rectum.

Wider operations are now being performed for intestinal malignancy with the object of removing *diseased lymph-nodes*, *vessels associated directly with the affected gut*, the *lymphatic apparatus connected with the neoplasm* by anastomosis and *fat* in which they lie, which may necessitate extirpation of the *epicolic*, *pericolic*, *intermediary*, or *main group glands*, one or all, of which the former is the least important (Figs. 27, 660).

Mesentery and Mesocolon.—The mesentery (Fig. 650), which anchors intestinal convolutions to the abdominal wall, incases blood- and lymph-vessels, nerves, glands, and some fat.

Mesentery of the large intestine is quite thick, contains an abundance of fat, and is designated the *ascending*, *transverse*, *de-*

scending, or *sigmoidal mesocolon*, according to the segment of bowel to which it is attached. There is no longer a *mesorectum*, since what was formerly described as the upper third of the rectum is now considered a part of the pelvic colon because of its peritoneal covering and mesentery.

The *meso-appendix* connected with the *cecal mesocolon* is the double peritoneal reflection surrounding the appendix almost to the tip, which shelters blood- and lymph-vessels and nerves embedded in connective tissue.

Chapter LX

Physiology of the Gastro-intestinal Canal

SINCE every pathologic is a modification of a physiologic process, an understanding of digestion, peristalsis, absorption, and defecation is necessary for physicians who treat rectocolonic and anal diseases.

Digestion provides the body with energy accomplished through the mechanical and chemical action upon food which prepare it for assimilation. Digestion, beginning in the mouth and ending in the small intestine, is accomplished by mastication, kneading movements of the stomach, and peristaltic contractions of the intestine, which break up the food into particles of suitable size and mix it with alimentary digestive secretions, ferments, or enzymes, which through their chemical action—cleavage—split food elements into less complex bodies, making them absorbable.

The chemical action takes place in the following manner: the carbohydrates undergoing chemical changes through saliva, the active ferment of which is ptyalin or amylase. This ferment acts upon starch, liquefying and converting it partially into dextrin and maltose. This amylolytic digestion continues in the stomach until acidity of gastric juice checks the action of ptyalin, which requires an alkaline medium.

From now on digestion is carried on by gastric juice, pepsin and rennin becoming active. Pepsin with hydrochloric acid represents the proteolytic agent, which renders the insoluble proteins soluble and performs the cleavage of the protein molecule into albumoses, peptones, leucin, tyrosin, etc. Rennin curdles milk and transforms caseinogen into casein.

Soon after these chemical changes begin individual portions of the gastric contents are forced through the pylorus into the duodenum. As soon as an acid medium is present in the duodenum the pylorus closes through nervous reflex action, and remains in firm contraction until the chyme becomes neutralized and alkalinized by secretions of the liver and pancreas. Thus, evacuation of the stomach is regulated from the duodenum.

After chyme acquires an alkaline reaction a new phase of digestion sets in, carried on by bile and ferments of the pancreas. One ferment of the pancreas is trypsin, the action being similar to

pepsin, but only effective in alkaline medium. Another ferment of the pancreas is amylolytic and nearly identical with that in the saliva, converting starch into dextrin and maltose. Steapsin or lipase, the lypolitic ferment, acts together with bile upon different fats, emulsifying them and splitting them into glycerin and fatty acids.

The secretion of glands within the intestinal wall contains the ferment enterokinase, which very powerfully assists the digestive action of the pancreatic juice and bile.

Absorption.—The colon takes no part in digestion, but plays an important rôle in the process of absorption. The chyme,



Fig. 662.—Appearance of colon artificially distended with air which was prevented from escaping by *X*, a hard-rubber self-retaining anal dilator.

which has already undergone digestion in the stomach and small intestine, is emptied into the large bowel in a fluid state, but during its passage through the colon and sigmoid flexure water (70 per cent.) and other absorbable portions of chyme are rapidly taken up, and by the time feces or non-nutritious part of the intestinal content reaches the rectum it has a semisolid or formed consistence. Absorption is interfered with when the mucosa is inflamed or ulcerated and in patients suffering from diarrhea.

In studying functions of the lower bowel the fact must not be overlooked that the rectum possesses remarkable powers of absorption; in fact, the constitutional effects of some drugs—morphin, co-

cain, and belladonna—are more quickly obtained when introduced per rectum, and in some cases a smaller dose is required than when administered by mouth. The most striking example of absorption per *rectum* and *colon* is shown in the benefits derived from nutritive and enemata of warm saline solution after profuse hemorrhage or for the relief of surgical shock.

Furthermore, the colon seems to be the place for the absorption of toxic substances developing in the course of abnormal decomposition of proteins, due apparently to the influence of prolonged bacterial putrefaction or presence of abnormal types of bacilli, which produce in the body effects of toxic character. This so-called *auto-intoxication* is becoming more and more generally recognized as a cause of certain obscure diseases.

After having outlined the chemical changes of the food and its absorption, we now consider that part of the digestive process by which is carried out the mechanical division and transportation of food through the digestive tube.

Through mastication and kneading action of the stomach, assisted by the decomposing action of the gastric juice, the food is of semiliquid consistency when it enters the duodenum, but chyme still contains coarse particles of food, and it is left to peristalsis of the intestine and action of the pancreatic and intestinal juices to complete the transformation of chyme into a sticky liquid mass having an alkaline reaction and light yellow color, from the biliary pigment, but as yet no fecal odor. After reaching the colon the intestinal contents show a dark brown coloration—due to hydrobilirubin—assumes the fecal odor—skatol—and the reaction becomes neutral or slightly acid.

From being still fluid, or nearly so, in the cecum and ascending colon, feces assume a more and more solid consistence in their descent through the colon as the result of constant loss of water. In the sigmoid flexure they are prepared for final expulsion into the rectum and from the body, and if long detained fecal matter hardens to such an extent as to interfere with normal defecation.

Peristalsis is the mechanism by which the stomach, small intestine, and colon propel chyme and feces through their various segments.

Under normal conditions shortly after meals *constrictions* make their appearance in the middle of the *stomach*, moving in a peristaltic wave toward the pyloric end, expelling first liquid and then semifluid contents. At the end of gastric digestion everything contained in the stomach, including coarse particles, has been expelled.

Peristaltic action of the small *intestine* begins at the duodenum, but is not continuous throughout the length of the small bowel, for pronounced movements occur simultaneously in several almost equally divided segments of gut, while the intermediate portions remain in repose. After a short time inactive segments become involved in the peristaltic movement and others become quiescent.

The purpose of peristalsis is threefold: (a) To mix chyme thoroughly with the digestive secretions, (b) facilitate absorption, and (c) move the intestinal content toward the colon and rectum.



Fig. 663.—Showing position of food at four hours.

Movements of the *small intestine* are fourfold: (1) *Pendulum* movement, produced mainly by the longitudinal muscle-fibers. A part of the gut a few inches long rotates back and forth in its longitudinal axis without a noticeable change in its lumen. (2) *Rhythmic* segmentation, as at regular intervals simultaneous constrictions of the gut appear. (3) *Peristaltic* waves, which run over a greater or less length of the gut in such a way that a marked contraction of the circular muscle-fibers continues toward the anus. Simultaneously the gut below the constriction becomes dilated. These waves are only a few inches in length. (4) *Rolling* movement, peristaltic waves, through which the contents of the intestine are carried about 5 to 6 inches (12.70–15.24 cm.) toward the anus.

The above varied movements are especially noticeable in the small gut, and under normal conditions carry food from the duodenum to the cecum within *three to six hours*.

Movements of the large intestine are slower, less frequent, and transport contents of the cecum into the rectum within *twenty to thirty hours*. Besides waves toward the anus, there appear in the colon—ascending part—waves in the opposite direction, so-called *antiperistaltic waves*, which occur about once in a *quarter* of an hour, lasting a few minutes. They move the contents of the cecum and ascending colon back and forth, making a reservoir of the former, facilitating watery absorption, which is especially pronounced here.



Fig. 664.—Position of food at eight hours.

Normal peristaltic waves cannot be seen with the unaided eye, but in cases of acute obstruction *intestinal movements* are plainly visible and palpable through the abdominal wall.

The length of time required for transportation of chyme and feces through different segments and the entire bowel has been determined by the administration of coloring matter in food and examining gastro-intestinal movements *fluoroscopically* and *studying radiographs* (Fig. 663–669) made of the stomach, intestine, and rectum subsequent to administration of bismuth or, preferably, barium test-meals and rectocolonic enemata for a given period.

The first part of a meal may be evacuated in *ten*, while the last portion may take *thirty* hours, and the normal daily movement represents feces that have collected in the lower colon, sigmoid flexure, and rectum during twenty-four hours, and do not necessarily represent food consumed within this period. Founded on radiograph studies of the *intestine* following meals in 2 cases



Fig. 665.—Position of food at twelve hours.

Rieder¹ (Figs. 663-669) published numerous radiographs to show the time required for feces to reach different colonic segments and the rectum:

	Male.	Female.
Cecum in.....	$3\frac{1}{2}$ hours	$3\frac{3}{4}$ hours
Hepatic flexure in.....	$4\frac{1}{2}$ "	$6\frac{1}{4}$ "
Splenic flexure in.....	$15\frac{1}{2}$ "	$9\frac{1}{2}$ "
Sigmoid flexure and rectum in.....	24 "	$19\frac{3}{4}$ "

Time required for the transportation of chyme and feces through different segments of the alimentary tract varies in different subjects and in health and disease, being modified by diet, emotional disturbances, exercise, intestinal obstruction, and lesions causing diarrhea.

¹ Reider, Tortschrette a. d., Geb. d. Rongenstrahlen, vol. xviii, No. 11, published by Lucas Grafs and Sillem, Hamburg.

The results of studies and experiments conducted by the author based upon fluoroscopic examinations and roentgengrams to determine the time required for feces to reach different rectocolonic segments agree in the main with Reider's findings.

Feces.—The amount, consistence, shape, color, and reaction of feces is variable, being subject to change in health and disease. The healthy individual should have one copious evacuation in twenty-four hours; the average daily discharge is from 4 to 6 ounces (120–180 gm.) in weight, and composed of about 75 per cent. of water and 25 per cent. of solids.



Fig. 666.—Position of food at sixteen hours.

The stool in health is of a firm or doughy consistence and is cylindric in shape; the feces have a light or dark brown color, an offensive odor from skatol (due to putrefaction), and ordinarily an alkaline reaction.

Under normal conditions the passage consists of digestive juices and non-absorbable food residues, bacteria, epithelial detritus, and mucus.

The shape of the fecal mass varies, depending upon the percentage of water; it is usually round, about 1 inch (2.54 cm.) in diameter and from 4 to 8 inches (10.16–20.32 cm.) in length, but when the amount of water drops from 50 to 25 per cent., it loses

its fluid-like consistence, and large hard or small nodular fecal masses form. The brownish hue of feces, due to bile pigment and hematin, change to a light yellow during a milk diet or bilious attack; dark brown or black as the result of the administration of bismuth and iron; and evacuations of patients suffering from typhoid or cholera may be gray or greenish in color.

Reaction of the feces is usually *alkaline*, but may be acid in healthy individuals who confine themselves to a vegetable diet. In normal feces remnants of the food can be detected macroscopically.



Fig. 667.—Position of food at twenty hours.

Flatus of the intestinal tract, composed of several gases, plays an important part during digestion, and passage of the chyme and feces through the small and large intestine by stimulating peristaltic action. Flatus in health and disease is increased by eating peas and beans.

Carbonic acid, hydrogen, carbureted hydrogen, nitrogen, and sulphureted hydrogen are the principle gases found in the stomach and intestine. Flatus is taken up by the circulation and discharged with feces, or in certain pathologic conditions escapes by mouth.

Flatus and tympanites are distressing manifestations of certain

diseases of the colon and rectum, such as catarrhal coloproctitis, fissure in ano and stricture, cancer, or other obstructing lesion.



Fig. 668.—Position of food at twenty-four hours.

Defecation.—Having briefly considered digestion, the manner in which chyme and feces are transported through the intestine,



Fig. 669.—Shows sigmoid flexure bent upon the rectum and to the right of the median line, its normal position during the completion of the act of defecation.



Fig. 670.—Showing the sigmoid flexure in the median upright posture, a position assumed by it early during the act of defecation.

and called attention to the absorptive power of the colon and rectum, it remains for the author to discuss defecation or process

by which indigestible and non-absorbable food remnants and residue of gastro-intestinal secretions are discharged from the body.

The beginning and completion of defecation are voluntary, but the intermediary stage is not under control of the will.

Stimuli responsible for intestinal movements preceding and those inciting a desire to defecate are not fully understood, though it is known peristalsis and an impulse to stool may be induced by gas or fecal distention, weight or irritation of dry hardened fecal accumulations, chemical changes, bacterial toxins, and the other

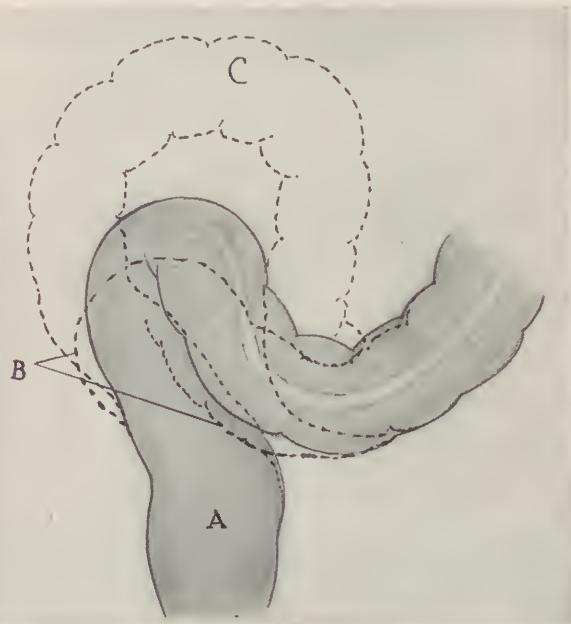


Fig. 671.—Varying lengths of the sigmoid flexure and mesentery: *A*, Normal; *B*, short; *C*, long.

irritants in the intestinal content, emotional disturbances—terror, anxiety—and artificially by pinching or applying electricity to the gut and pathologically by lesions that inflame or ulcerate the mucosa or occlude the bowel, producing a sensation of weight and fulness. In fact, distention, pressure, or anything that irritates terminal nerve filaments in the mucosa may bring about defecation.

The *sigmoid* flexure, owing to its varying length (Fig. 671, *A*, *B*, *C*), location, curves, and sharp angulation at the recto-sigmoidal juncture (Fig. 657), and the *rectum*, because of Houston's valves, levator ani muscle, narrow anal canal, and sphincter are

natural reservoirs in which solidified feces collect and remain until expelled.

When fecal matter is retained in the pelvic colon defecation is inaugurated in the abdomen through ring-like or vermicular peristaltic contractions that drive it into the rectum as the sigmoid flexure raises up, is tilted to the right and straightens out through being distended by the feces passing through its lower extremity (Fig. 672, A, B, C), but when they have already been discharged into the rectum before the desire for an evacuation occurs—which

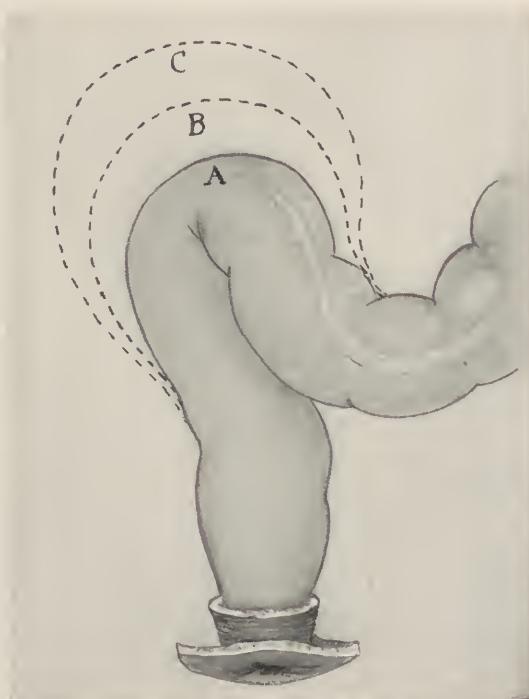


Fig. 672.—Position assumed by the sigmoid flexure: A, When empty; B and C, as it becomes distended preceding defecation.

is usual—the sigmoid does not necessarily undergo the above movements.

Briefly described, the steps or stages in the process of defecation are, viz.: (a) Through voluntary closing of the glottis, following inspiration and forcing the diaphragm downward, abdominal muscles are drawn inward, a combination that by compressing viscera increases intra-abdominal pressure; (b) the lower colon undergoes vermicular movements, due to alternate contraction of circular and longitudinal muscle-fibers, and at the same time the

sigmoid telescopes—invaginates—(Fig. 673) into the rectum, acting like a piston, due to colonic movements that propel feces through O'Beirne's sphincter by exerting marked pressure upon them; (c) directly upon their passage through the rectosigmoidal juncture feces come in contact with the *uppermost rectal valve*—left side—where they are temporarily arrested or glide downward to the *middle*—right side—and from thence to the *lowermost rectal valve* on the left side, just above beginning of the fixed rectum; (d) consequent upon pressure exerted by the approaching fecal mass upon the funnel-shaped upper extremity of the anal canal

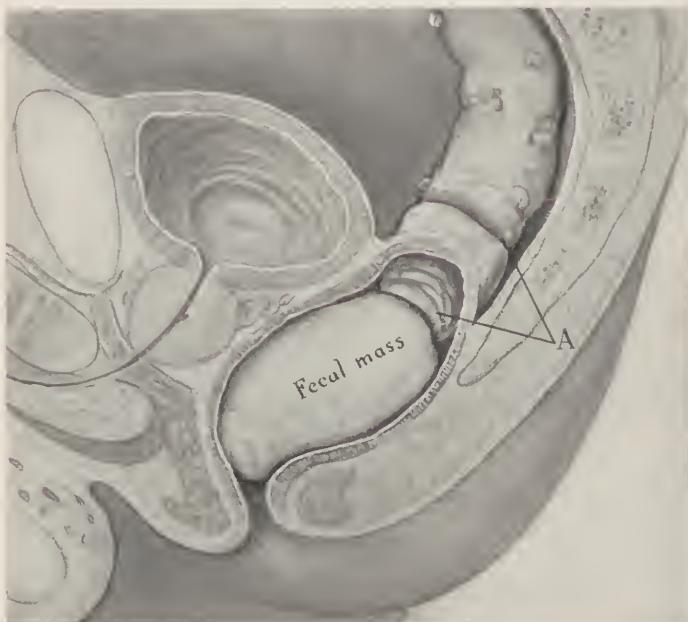


Fig. 673.—Showing the manner in which the bowel upon straining (A) invaginates, and through its driving—*piston-like*—action assists in expelling feces during defecation.

an imperative desire to stool is produced, which is followed by augmented pressure of the diaphragm, abdominal muscles, and downward piston-like action of the *telescoped sigmoid* upon the fecal mass (Fig. 673); (e) as feces enter the anal canal the levator ani and sphincter muscles simultaneously relax to permit their passage, and (f) the act of defecation is completed by contraction of the levator ani muscle and rectal wall, which, acting in conjunction, expel the last remnant of fecal matter.

Emptying the sigmoid flexure is accomplished mainly by increased abdominal pressure induced through forcing the dia-

phragm downward and contraction of abdominal muscles, while expulsion of feces from the rectum is consummated chiefly through the piston-like action of the telescoped sigmoid, compression of the fecal mass by the muscular wall of the rectum, and contraction of the levator ani muscle at the completion of defecation, of which the first is the principal factor.

The expulsive action of the invaginated sigmoid (Fig. 673), which is progressive from above downward, is easily demonstrated by inserting the finger or proctoscope, and placing marbles or tampons in the pelvic colon, and having the patient strain as if at stool, whereupon the sigmoid is felt or seen to enter the rectum, forcing the foreign bodies downward through the anus as the proctoscope is slowly withdrawn.

The transportation of the intestinal contents through the colon, sigmoid flexure and rectum, and defecation are facilitated by water drinking, consuming fruit acids, exercise, and avoiding foods leaving a bulky, coarse residue.

Chronic obstruction in the large intestine, tight rectosigmoidal juncture, enlarged rectal valves, narrowing of the anal canal and hypertrophy of the levator ani or sphincter muscle interfere with daily evacuations and effectual defecation by obstructing or arresting passage of the feces, and stools may be diminished or increased in frequency through powerful emotions—terror or anxiety—that inhibit or exaggerate action of the intestinal musculature and rectal muscles concerned in the propulsion and expulsion of feces.

Inflammatory and ulcerative lesions in the colon and rectum also increase fluidity and frequency of evacuations. When desire to stool is regularly heeded, comfortable daily movements ensue, but when the impulse is persistently ignored the desire soon passes away. Careless individuals, who frequently postpone going to the toilet when the feeling to empty the bowel is imperative, sooner or later suffer from constipation because sensibility of the mucosa has become obtunded through daily trauma induced by hardened feces, which under these circumstances fail to produce a desire for an evacuation.

O'Beirne maintained that the rectal content is promptly returned to the sigmoid flexure by reverse peristalsis when the bowel is not emptied immediately following a desire to stool, which he believed accounted for the sudden cessation of the impulse.

Repeated digital examinations and inspection of the rectum through the proctoscope by the author has disproved this theory, for in nearly every instance the rectum contained feces when an

evacuation had been deferred with or without a previous desire to stool. Scybalæ and foreign bodies are occasionally transported from the rectum into the sigmoid or colon by reverse peristalsis or strong contractions of the rectal wall when the mucosa is highly sensitive, irritated by a foreign body or ulcerated, or the lower bowel is occluded by a stricture or tumor, affections sometimes complicated by fecal vomiting. Occasionally after the impulse to evacuate has passed the fecal mass may be seen or felt resting upon the upper surface of a rectal valve, or above the entrance to the anal canal, when the levator ani is irritable and hypertrophied.

The impulse to defecate originates in the hemorrhoidal and inferior mesenteric nerve plexuses, from whence it is transferred in turn to the lumbosacral cord and brain, where are located centers that *inhibit* or *augment* muscular activity, thereby increasing or decreasing frequency of the stool.

Lesions or injuries involving a cross-section of the cord about the first lumbar vertebra are frequently complicated by rectal and vesical incontinence, which sometimes subsides gradually, and brain lesions have been accompanied by paralysis of the anal sphincter.

Sensibility of the Small Intestine, Colon, and Rectum.—The outer surface and mucosa of the stomach, small intestine, and colon are but slightly sensitive to tactile, thermic, chemical, or electric contact, and extensive lesions may involve the mucous membrane in these segments of the alimentary tract and upper rectum and cause little or no pain, but small lesions situated near the anus induce intense suffering owing to high sensibility of the anal canal.

The stomach, intestine, and colon may be handled without discomfort unless tension is made upon the mesentery, which is accompanied by sickening pain, and when patients suffer acutely, the result of gastric or intestinal lesions, pain is induced by *contraction* of the *musculature* incited by them, or to stretching of the outer coats of the stomach or gut by gas or fecal accumulations.

Chapter LXI

Diagnostic Significance of Manifestations Pointing to Disease Located in the Colon and Sigmoid Flexure

SINCE manifestations pointing to lesions located in the small and large intestine differ from those situated in the anorectal region (see Chapter III, Vol. I), they have been separately discussed in this chapter that their frequency and individual importance may be duly emphasized.

MANIFESTATIONS AND SIGNS OF DISEASE INVOLVING THE COLON AND SIGMOID FLEXURE

- | | |
|---|--|
| 1. Diarrhea. | 22. Mixed intestinal infection. |
| 2. Constipation. | 23. Sepsis. |
| 3. Diarrhea alternating with constipation. | 24. Abdominal abscess and fecal fistulae. |
| 4. Obstipation—intestinal obstruction. | 25. Hepatic abscess. |
| 5. Fecal impaction. | 26. Stigmata. |
| 6. Auto-intoxication. | 27. Pot belly. |
| 7. Enterospasm—spastic constipation. | 28. Altered feces. |
| 8. Gastro- and enterogenic disturbances. | 29. Urinary changes. |
| 9. Enteroptosis. | 30. Blood changes. |
| 10. Hemorrhage. | 31. Disturbance in neighboring organs. |
| 11. Colic. | 32. Cachexia. |
| 12. Localized pain and soreness. | 33. Loss in weight. |
| 13. Nausea and vomiting. | 34. Rise in pulse and temperature. |
| 14. Flatulence and tympanites. | 35. Meteorism. |
| 15. Discharge of mucus, pus, blood, and tissue débris. | 36. Gurgling and splashing sounds. |
| 16. Abdominal sensations of uneasiness and fulness. | 37. Abnormal abdominal muscles. |
| 17. Vermicular intestinal movements. | 38. Crawling sensations. |
| 18. Local and general peritonitis. | 39. Skin lesions and discolorations. |
| 19. Intestinal perforation. | 40. Sensations of bowel blocking. |
| 20. Abdominal swellings and tumors. | 41. Sensitive spinal skin areas. |
| 21. Enlargement of the inguinal, abdominal, and sacral lymph-nodes. | 42. Inability to introduce the finger, sigmoidoscopic, colon tube, or enemata. |
| | 43. Neurogenic diarrhea. |

Diarrhea.—Loose movements are the most frequent symptoms of disease within the gastro-intestinal tract, and may be an indication of *neurogenic disturbances, psychic impulses, gastric or enteric disease, ptomain poisoning, any form of catarrhal or specific enteritis or colitis, intestinal parasites, foreign bodies, fecal impaction, chronic intestinal obstruction—stricture, cancer, etc.—or disease elsewhere affecting the bowel reflexly or by distention.*

Constipation.—Costiveness often expresses an atonic state of the intestinal musculature, but may result from or be associated with *gourmandizing, irregular living, simultaneous contraction of the circular and longitudinal muscle-fibers—enterospasm—mechanical intestinal obstructions, hepatic affections, and other causes and diseases discussed elsewhere.*

Diarrhea Alternating with Constipation.—This condition is observed in *myxorrhea membranacea* and *myxorrhea colica, cancer, stricture, kinks, and other obstructing intestinal lesions, fecal impaction, or foreign bodies* that diminish or occlude the intestinal lumen.

Delayed evacuations and intestinal stasis are observed when from any cause the intestine is chronically obstructed by adhesions, stricture, cancer, invagination, volvulus, kinks, etc.

Fecal Impaction.—This condition may indicate *careless habits, atonic constipation, enterospasm, obstipation, disease or injury to the brain or spinal cord*, or may complicate local or general diseases, when daily stools are not obtained and feces are permitted to accumulate and become firm and nodular.

Intestinal auto-intoxication complicates atonic and spastic constipation, chronic intestinal obstruction—stasis—and affections accompanied by inflammation and ulceration of the gastro-intestinal mucosa. Malaise, headache, anemia, sallow complexion, abdominal discomfort, despondency, and other *symptoms and end-results of inefficient drainage and absorption of intestinal toxins* are met with in *atonic, spastic, and obstructive constipation—obstipation—and chronic inflammatory and ulcerative diseases of the colon.*

Enterospasm—Spastic Constipation.—Simultaneous contraction of the longitudinal and circular muscle-fibers inducing temporary bowel occlusion may be incited by *fecal impaction, foreign bodies, tumors, undigested food remnants, or lesions that irritate the mucosa or obstruct the large or small intestine.*

Enteroptosis.—Ptosis of the colon or sigmoid flexure may exist independently or with falling of other organs. Intestinal ptosis is associated with *diseases causing emaciation or relaxation of tissues, may be due to an excessively large or long bowel, an elongated mesentery, or follow the breaking of bowel ligaments.*

Colic.—Cramps are a manifestation of gastric, hepatic, duodenal and pancreatic disease, *intestinal parasites* and the varied types of *chronic intestinal obstruction, and complicate intestinal cancer, stricture, and ulcerative and inflammatory catarrhal and specific diseases of the small and large intestines.*

Flatulence and Tympanites.—Flatulence is observable in nearly all gastro-intestinal affections, and marked tympanites is particularly troublesome in patients suffering from digestive disturbances, excessive intestinal *fermentation*, *putrefaction*, *enterocolitis* and *cancer*, *stricture*, and other lesions that block the bowel, causing retention of gas and feces.

Discharges of Pus, Blood, Mucus, and Tissue Débris.—Mucus in the form of jelly-like masses, strings or casts of the bowel, are encountered in *catarrhal* and *mucomembranous colitis*—*myxorrhea coli*. When evacuations are composed of or contain mucus, blood, and pus in considerable amount, the patient suffers from some type of *ulcerative colitis*, and when, in addition, tissue *débris* is found in the stools the mucosa is extensively involved by *cancer*, *stricture*, *papillomata*, *bacillary* or *amebic infection*, accompanied by extensive sloughing or formation of a diphtheric membrane. When the blood is fresh, *hemorrhoids*, *fissure*, or other rectal disease is suspected, but when it is clotted blood usually comes from lesions—*colitis*, *cancer*, etc.—located in the sigmoid flexure, colon, or small intestine. Thick yellow pus is indicative of *fistula* or a *diverticulum* emptying into the lower bowel and a copious mucopurulent discharge often accompanies *streptococcic colitis*.

Abdominal Sensations of Uneasiness and Fulness.—Colonic sensations of uneasiness are frequently complained of by patients afflicted with *intestinal parasites*, lesions causing an *abundant discharge*, and *membranous enterocolitis*.

Vermicular Intestinal Movements.—Worm-like contractions of the intestine point to an obstruction in the *upper colon* or small intestine, induced by a *foreign body*, *fecal impaction*, *stricture*, *cancer*, or *kink*, etc., but such movements may be incident to irritation of the mucosa, caused by *tape* or *lumbricoid worms*.

Local or General Peritonitis.—Chronic local peritonitic inflammation is a frequent manifestation of *diverticulitis*, *intestinal angulation*, *kinking*, *stricture*, *cancer* or other obstructive lesions, *catarrhal*, *tubercular*, *syphilitic*, *bacillary* and *amebic colitis*, and *abdominal*, *pelvic*, *inflammatory*, and *suppurative diseases*. Acute general peritonitis is encountered less often and usually complicates *appendicitis*, *diverticulitis*, or *perforation* of the stomach, small intestine, or colon at the site of some form of ulceration.

Intestinal perforation or *rupture* may follow *careless introduction* of the *sigmoidoscope*, *bougie*, or *hand* into the bowel, but is often caused by *catarrhal* or *specific ulcerative colitis*, infected *diverticula*, *ulceration*, *cancer*, *abscess*, *worms*, *foreign bodies*, or *injury* to the gut caused by operation or an accident.

Abdominal Swellings and Tumors.—Soft resonant swellings usually indicate local gas accumulations; firm tumors with cachexia and marked loss of weight point to intestinal cancer. Right-sided soft masses are observed in chronic appendicitis, and harder bulging masses in this region, where the patient has a sallow complexion and diarrhea, are usually neoplastic tuberculous enlargements. Localized swellings in the left lower abdominal quadrant, characterized by constipation and septic symptoms, are usually diverticular abscesses; large or small, soft or firm indentable tumors that can be stripped along the bowel are usually impacted fecal masses.

Enlargement of the Inguinal, Abdominal, and Sacral Lymph-nodes.—Enlarged inguinal glands are met with in *syphilis* and *anal epitheliomata*; swelling of the sacral and abdominal nodes characterize *rectal* or *colonic cancer*, *intestinal tuberculosis*, and *septic foci* in the pelvis or abdomen.

Mixed Intestinal Infection.—Infection by tubercular or dysenteric bacilli—Shiga, Entamoebæ histolytica, gonococci, and intestinal parasites—may induce an active inflammation and pinpoint or diminutive *ulcers* in the mucosa, but when the superficial and deeper coats of the bowel are involved and the patients suffer from intestinal toxemia or sepsis, accidental and obligate intestinal micro-organisms participate to cause *mixed infection*.

Acute Sepsis.—This condition seldom complicates colonic affections, but when it does it is indicative of *intestinal perforation*, complicating *foreign body* intestinal parasites, *cancer*, *stricture* or *kink*, *diverticulitis*, *appendicitis*, or *ulcerative colitis*.

Abdominal Abscess and Fecal Fistula.—Any of the lesions just enumerated and disease in the uterus, ovaries, tubes, or bladder may lead to the formation of an abscess that drains externally or discharges into the bowel, forming a fecal fistula. Abdominal abscesses and fecal fistulæ are often sequelæ to the breaking up of adhesions, diverticulitis, leaving of gauze, tubes, or instruments in the abdomen, injury to the gut, and improperly performed operations.

Hepatic Abscess.—The liver may become infected in various ways, but when abscess is associated with chronic diarrhea and bowel symptoms, it is usually secondary to *amebic colitis*—dysentery.

Stigmata.—Congenital markings—Hutchinson's teeth, ulcers of the mouth, throat, vagina, and anal canal, and copper-colored spots on the skin (legs) and chronic diarrhea—are signs of *inherited lues* complicated by *syphilitic colitis*.

Pot-belly.—The abdomen is often prominent in *gastric* and

enterogenic disturbances, where intestinal fermentation and putrefaction are distressing, also in chronic intestinal obstruction; but where the abdomen markedly protrudes (Fig. 883), *enteroptosis*—colon ptosis—colonic dilatation or *megacolon*, Hirschsprung's disease should be suspected.

Altered Feces.—*Chronic disease* of the small intestine and colon frequently modifies the odor, color, consistence, form, reaction, content, or amount of chyme or feces, and increases or diminishes frequency of the stools. Evacuations having a disgusting odor are encountered in *intestinal cancer*, *ulcerative colitis*, and where fermentation and putrefaction are troublesome. Tape or pencil-shaped stools are indicative of a *narrow anal canal*, *stricture*, or *cancer* of the rectum; when excreta is voided solid and in short narrow or pointed pieces, their changed form is caused by *irritability* or *hypertrophy* of the *sphincter* or *levator ani muscles*, which spasmically contract during defecation. Ova, larvæ, and segments of worms in the stools are sure signs of *intestinal parasites*. Undigested food remnants are positive proof the patient has *gastrogenic* or *enterogenic* disturbances; when tubercle or dysenteric bacilli, *Entamœbæ histolytica*, coccidia, ciliates, or flagellates are found in the stool and chronic diarrhea is the dominant symptom; the patient suffers from *tubercular*, *bacillary*, *entamebic*, or other form of infectious or parasitic *colitis*. Small pieces of tissue *débris* indicate *papillomata* or *polyps*, but when large masses or strips of the bowel are evacuated *cancer* or a *specific diphtheric* or *phlegmonous colitis* (Fig. 718) is rapidly destroying the gut.

Discoloration of movements is observed in *hepatic* and *pancreatic* disease, *colitis*, and following the administration of certain medicines.

The reaction of feces may be modified by the food consumed, medication, and normal chemical changes in the gastro-enteric juices when the patient suffers from gastro-enteric disturbance.

Urinary Changes.—Increased indican is a manifestation of *constipation*, *obstipation*, and *intestinal stasis*—with intestinal auto-intoxication—excessive ethereal sulphuric acid indicates *albuminous putrefaction* and *infectious disease*; acetone is indicative of gastro-intestinal *catarrh* or *parasites*, *fecal impaction*, or *abdominal inflammatory disease*; bile pigments appear in *hepatic* disease; increased glucose is observed in *disturbed metabolism*, and there is an excess of urinary sediment in *ulcerative colitis*, causing chronic diarrhea; excessive albumin and decreased urea indicate *Bright's* disease, chronic nephritis, and an abundance of sugar or diacetic acid points to *diabetes*.

Blood Changes.—Ordinary and sometimes pernicious anemia are sequelæ to *intestinal obstruction*, *colitis*, *parasites*, and other intestinal diseases, accompanied by *constipation* or *diarrhea*, where considerable *blood is lost* or *toxins* are absorbed faster than they are eliminated. Leukocytosis gives evidence of *malignancy* affections of the colon or *suppurative* intestinal lesions, and increased eosinophils indicate *gastro-intestinal parasites*—trichinosis.

Disturbance in Neighboring Organs.—Pain and soreness resulting from intestinal lesions may be observed in neighboring organs, or the bowel may be directly or indirectly affected by disease in structures adjacent to or distant from it.

Cachexia.—Where the skin is of a dirty color, marked by darkish brown splotches, and has a disgusting odor the patient probably suffers from *intestinal auto-intoxication* secondary to *constipation* or *colitis*; when the complexion is sallow and there has been a gradual loss in weight, and diarrhea and cramps are annoying the bowel is probably *tuberculous*; a darkish green integument, together with alternating constipation and diarrhea, pus, mucus, and blood in the stools and marked emaciation point to *cancer* of the colon, sigmoid flexure, or rectum.

Loss in Weight.—Rapid emaciation is most marked in *cancer* of the bowel, and these patients not infrequently lose from 20 to 50 pounds in a few weeks. *Tubercular colitis* complicated by lung involvement usually causes gradual, but considerable loss in weight; all extensive inflammatory and all forms of ulcerative diseases of the intestinal mucosa are accompanied by emaciation to a greater or lesser degree.

Rise in Pulse and Temperature.—The pulse and temperature are slightly modified in all forms of *infectious colitis*—particularly where inflammation extends to the peritoneal covering of the bowel, when mixed infection has taken place and pus is being absorbed or foul discharges and undigested food remnants are retained. A marked jump in the pulse-beat and temperature, with vomiting, localized right-sided pain, tenesmus, and rigidity indicate *appendicitis*, *salpingitis*, *pelvic cellulitis*, or *hematogenous kidney infarct*; when the tender area is in the left lower abdominal quadrant, *diverticulitis* or *pelvic abscess* probably cause it; rapid irregular thread-like pulse associated with a very high or sub-normal temperature is frequently encountered in profound specific and *mixed infection* of the colon, *intestinal perforation*, extensive abdominal *abscesses*, and septic *peritonitis*.

Nausea and vomiting complicate *intestinal obstruction* and many other *gastro-intestinal* disturbances.

Neurogenic Diarrhea.—Nervousness and despondency accompanied by frequent early morning fluid evacuations, devoid of pus, blood, or mucus, are indicative of *prandial-neurogenic diarrhea*.

Exhausting sudden nausea, vomiting, and watery diarrhea, complicated by restlessness, dizziness, syncope, cramps, rapid pulse, and unconsciousness with muscular paralysis are the chief manifestations of *ptomain poisoning*, caused by the *Bacillus enteritidis*, *B. coli*, *B. butyricus*, *B. botulinus*—*sausage poisoning*—*staphylococci*, *solanin-potato poisoning*—and *muscarin-mushroom poisoning*.

Meteorism prevails to a greater or less degree in practically all *intestinal affections*, and because of this it is not a specific diagnostic manifestation.

Gurgling and Splashing Sounds.—These sounds are usually heard in the cecal region following tapping of the abdomen in cases of *chronic diarrhea* due to *colitis*, but are more pronounced below *occluded segments*, particularly after an effort is made to liquefy feces that they may pass the obstruction.

Abnormal Abdominal Muscles.—Flabby abdominal muscles are encountered in local and general *wasting diseases* accompanied by emaciation, intestinal *auto-intoxication* with relaxation of tissues, *enteroptosis* and *chronic dilatation* of the colon. Rigidity of these muscles is indicative of *intestinal obstruction* or some inflammatory or suppurative processes within the abdomen—*appendicitis*, *peritonitis*, or *abscess*.

Crawling sensations are usually induced by *gas*, *intestinal worms*, collections of dried, stringy *mucus* or *enterospasm*, due to anything that irritates the mucosa.

Skin Lesions and Discolorations.—Erythema and a variety of eruptions have followed *colonic irrigations* and enemata where strong *alkaline soaps* were employed; skin lesions occasionally appear during attacks of *ptomain poisoning*, frequently complicate acute *inflammatory processes* in the bowel, and are nearly always a manifestation of *chronic constipation* and *bowel stasis* with *intestinal auto-intoxication*, under which circumstance the patient has a *muddy complexion* and *dark brown splotches* on the face and body.

Sensation of Bowel Blocking.—Where the patient repeatedly feels as if the bowel were obstructed at a given point, *cancer*, *stricture*, *diverticulum*, *kink*, *angulation*, or *invagination* should be suspected, but this symptom may be induced by fecal *impaction*, collections of membranous *mucus*, a *foreign body*, or *enterospasm*.

Sensitive Spinal Skin Areas.—Sensitive areas at *sides* of the

vertebral column point to *gastric or duodenal ulcer, appendicitis, or other lesions involving a viscus.*

Inability to Introduce the Finger, Sigmoidoscope, or Colon Tube.—Digital exploration of the rectum may be prevented by a *congenital anorectal defect, narrow anal canal, irritable sphincter, hypertrophied levator ani muscle, stricture, neoplasm, foreign body, or impacted feces.* When bougies, colon tubes, or enemata can be introduced into the rectum and fail to pass further upward, the inhibiting lesion is most frequently located at the rectosigmoidal juncture or in the sigmoid flexure, but may be located at any point along the colon. In these regions invagination of the sigmoid into the rectum, adhesions, angulations or kinks, enterospasm, pericolic membranes, cancer, stricture, and extracolonic pressure are most frequent causes of the obstruction.

Chapter LXII

Wounds and Injuries of the Abdomen, Small Intestine, Colon, and Sigmoid Flexure

INJURIES of the abdominal wall and small and large intestine occur more frequently than is thought, because reported cases are individual and statistics concerning them are rarely published (see Chapter X on Anorectal Injuries).

Wounds of the small and large intestine differ markedly in their manner of production, symptoms, diagnosis, and treatment from anorectal injuries, hence they have been discussed in a separate chapter.

The bowel may be traumatized, torn, or perforated from *within* by foreign bodies, air swallowed or introduced through the anus, worms, tumors, or ulcers, but more often the gut is injured by a contused, lacerated, or penetrating wound from *without*; in the *former* the belly wall remains intact, while in the *latter* external signs of trauma are in evidence.

The intestine may be slightly or remain undamaged when the abdomen is seriously injured, or be extensively traumatized, lacerated, or perforated at one or several points without there being external evidence to indicate the seriousness of bowel involvement.

It is difficult to judge the nature of intestinal injuries because when slight the patient occasionally exhibits troublesome symptoms, and when serious he may complain but slightly in the beginning, though dangerous manifestations appear later, incident to sloughing, perforation, or hemorrhage.

Rupture is the most common and dangerous type of injury, and the tear takes place with or without a corresponding abdominal wound. Rupture and perforation are most frequently induced by *contusions, penetrating wounds, pneumatic pressure, foreign bodies, ulcerative enteritis, colitis, or malignancy.*

Contusions.—Wounds of this class are most frequently induced by a blow, kick, fall, impact of a wagon tongue, rock, baseball, or other object thrown against the abdomen, being run over or squeezed between cars or machinery; and in such accidents the bowel may be compressed against the spine or pelvis and *ruptured*, or if distended with gas or feces *burst* from the impact. When the accident

occurs *unexpectedly* the injury is more serious than when it is anticipated and abdominal muscles have contracted and stiffened to protect the viscera.

Intestinal rupture from contusions may be *single* or *multiple*, *transverse*, *oblique* or *linear*, *small* or *large*, *clean-cut* or *ragged*, and *located* in any part of the small or large intestine. Statistics indicate that the small bowel is injured six times more frequently than the large, and the jejunum and ileum are involved more often than the duodenum.

Occasionally the sigmoid, hepatic, or splenic flexures are damaged, but the rectum is seldom injured as a result of abdominal contusions. Sometimes severe contusions but slightly disturb the gut, but in other instances an apparently trivial injury causes laceration, necrosis, perforation and peritonitis, or the formation of an abscess or fecal fistula.

Intestinal ulceration, malignancy, stricture, adhesions, kinks, and other mechanical obstructions that distort or weaken the bowel tunics or favor the retention of gas and feces, render the patient more liable to serious injury when the abdomen is struck by a blow or penetrated by a knife-blade, bullet, or shrapnel.

Intestinal rupture may be complete or incomplete, but when partial peritoneal and muscular coats are slightly or extensively lacerated and the mucosa extrudes—herniates—through them.

Skin and muscles may show ecchymoses, extensive laceration, or be crushed almost to a pulp following terrific contusions, and in addition to intestinal injury the mesentery may be torn from its attachment or injured so that necrosis occurs. Immediate or secondary abdominal hemorrhage infrequently complicates this class of wounds.

Pneumatic Wounds.—Pneumatic blow-outs represent a new type of industrial accident, and in such cases traumatic rupture of the small intestine, colon, or rectum is caused by compressed air (40 to 120 pounds) introduced into the bowel accidentally or in a spirit of fun.

Factories employ air for blowing away filings, dust, and shavings, power-cleaning flues, riveting bolts, etc., and laborers blow dust out of their clothing with it. In recent years 20 or 30 cases of intestinal rupture from this source have been reported, and in most instances injury was the result of *hazing* and caused by placing the compressed air nozzle over or in close proximity to the anus. The air in each case entered the anus and ruptured the intestine in one or several places, which was immediately evidenced by an outcry, collapse of the victim, and enormous abdominal distention.

For Andrew's illustrations showing the manner in which pneumatic injuries are produced see Figs. 674-676.

Usually pneumatic lacerations are multiple and occur in the sigmoid flexure, though no segment of the small or large intestine is free from them. Pneumatic ruptures may be *partial* or *complete*, but in the former peritoneal and muscular tunics give way and mucosa herniates through them; the openings may be small or large, and oblique, transverse, or longitudinal.

These serious injuries are rapidly increasing and radical measures should be taken to forestall such accidents, and jokers severely punished as a warning to others, as is done in England.

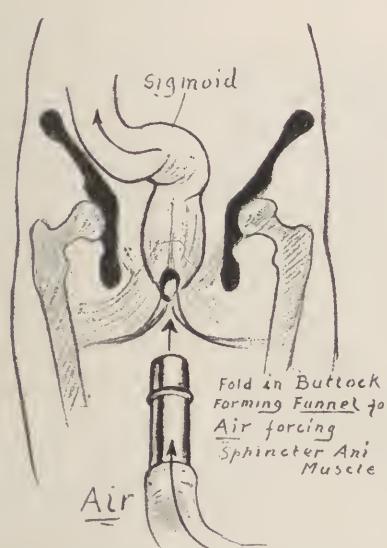


Fig. 674.—Funnel formed by buttocks guides air from pneumatic tube into the rectum, sigmoid, colon, and even the small intestine.

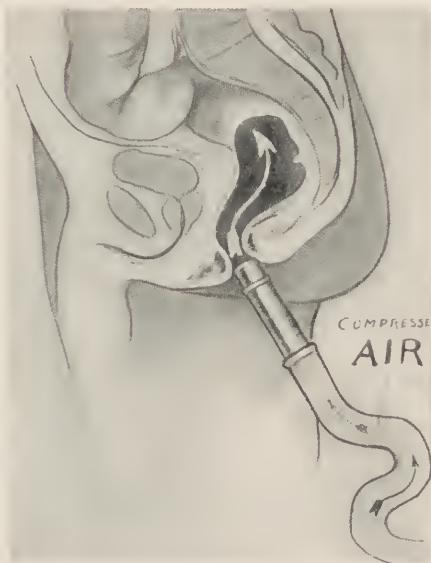


Fig. 675.—Manner in which the sphincter is divulsed by compressed air when the pneumatic tube is pressed against the anus.

The bowel has also been ruptured several times by ignorant and careless physicians attempting to use pneumatic sigmoidoscopes, who have overdistended the intestine with air or forcibly pushed the instrument through the gut wall.

Perforation and laceration are occasionally caused while distending the intestine with air, water, or medicated solutions during examinations or treatments, particularly when the bowel is distorted, ulcerated, or malignant.

Penetrating—Puncture—Wounds.—Penetrating injuries of the abdomen involving the large or small intestine are most often

caused by a bullet or knife thrust, but may be induced by shrapnel, bayonet, or any sharp or pointed object which has been run against, fallen upon, or thrown against the abdomen.

Sometimes the bowel is punctured from within by a foreign body—fish bone, safety-pin, needle, tack, knife, or piece of glass—that has been accidentally swallowed or introduced through the anus by despondent or insane individuals, and prisoners have frequently been known to swallow such objects with the idea of committing suicide or concealing them.

The author has personally known two men who made a business of swallowing nails, knives, and other sharp and pointed foreign bodies, both of whom eventually died from gastric or



Fig. 676.—Pneumatic rupture of the sigmoid as it appeared in Andrews' case.

intestinal perforation and peritonitis, and at autopsy a large collection of such objects was found lodged in the stomach, intestine, or rectum. Gunshot are usually multiple, while knife wounds of the intestine are often single, and the latter are large and the former small.

SYMPTOMS

The symptoms of intestinal wounds vary according to character and extent of the injury, but are alarming when perforation has taken place.

Following severe abdominal contusions there is more or less

shock, the patient is pale, nauseated, vomits, and has a cold skin, weak, thready pulse, subnormal temperature, and localized pain and tenderness.

When abdominal pain, muscular rigidity, restlessness, high temperature, and abdominal distention have developed, exploratory laparotomy is imperative, for in this way only can one locate and repair the injury.

Peritonitis develops less rapidly following minute perforations than extensive lacerations because in the former the opening may be partially or completely blocked by extruded mucosa. Tenderness, pain, and rigidity of muscles quickly subside following operation in favorable cases, but where peritonitis is a complication the prognosis is bad, for the patient may die or suffer from adhesions, abscess, fecal fistula, or sequelæ if he recovers.

Immediately following rupture the patient complains of severe colicky pain, abdominal distention, shows evidences of shock, and later becomes comatose, and death ensues quickly from peritonitis unless the rent in the gut is promptly closed.

Paralytic ileus is an occasional complication of all forms of severe intestinal injuries. Occasionally the stomach, small intestine, and colon are seriously damaged by ulceration or sloughing caused by swallowing *lye* or *acids* accidentally or with suicidal intent.

DIAGNOSIS

One can easily determine the extent of an external abdominal injury, but often it is impossible to ascertain if the bowel has been injured and to what extent prior to exploratory laparotomy.

Ordinarily one is justified in basing a diagnosis of intestinal perforation or rupture upon finding a bruised or punctured abdomen, where the patient is in a state of shock and complains of local pain and tenderness, nausea, fast pulse, subnormal temperature, abdominal distention, and is worried or exhibits manifestations of peritonitis. Free air, feces, gas, and blood in the abdomen are positive indications of intestinal rupture.

Berry and Guiseppe have made the following classifications of symptoms in 59 of their cases:

	Present.	Absent.
Severe pain	51	..
Vomiting	43	2
Shock	28	6
Local tenderness	35	2
Rigidity	50	4
Distention	11	14
Added dulness	18	14
Rising pulse	37	6

Following *pneumatic blow-outs* shock is profound, colic unbearable, and the abdomen is barrel shaped, and when opened the air comes sizzling out. Punctures from foreign bodies are rarely suspected until the abdomen has been opened to determine what is causing peritonitis.

In extensive knife and other wounds of the intestine eviseeration is sometimes encountered. Where the rectum has been punctured or lacerated the opening is felt or seen through the proctoscope, and pneumatic rupture of the sigmoid from instrumentation or compressed air may be located and inspected through the sigmoidoscope.

Where the duodenum is ruptured in addition to the usual symptoms, toxemia with a rapidly rising pulse and delirium are frequent complications.

Promiscuous probing is a dangerous procedure in all types of abdomino-intestinal puncture or rupture, and morphin is not prescribed until a diagnosis has been made, because it masks symptoms, and a serious may be mistaken for a slight injury.

Claybrook claims heart and lung sounds are heard by the ear over the abdomen and chest in this class of cases. Occasionally bulging of the peritoneum is detected in the rectovesical or Douglas' pouch by rectovaginal examination.

When the injured segment of bowel does not readily come into view, the intestine is stripped over the finger until the rent or openings are located, care being taken to examine the mesentery for injuries.

In perforation or rupture of the intestine there may be an absence of liver dulness owing to escape of gas into the abdomen.

Where gas or air is introduced into the bowel and escapes by the mouth there is no perforation, but when a large quantity is projected per anum and causes marked abdominal distention, it indicates a complete tear in the bowel.

Dangerous manifestations above enumerated are absent where the peritoneal and muscular tunics are ruptured, and the mucosa projects through them because neither gas nor feces escape into the abdomen.

Marked emphysema of the abdominal wall points to pneumatic rupture of the intestine, and the escape of gas and feces externally shows conclusively that the injury involves both abdomen and intestine.

TREATMENT

In suspected cases of intestinal rupture or perforation the abdomen is promptly opened, the intestine examined, and detected

rents immediately repaired, because mortality is high and rapidly increases hourly when operation is delayed.

In rare instances diminutive perforations and lacerated wounds heal without operative interference; when the patient is kept in bed the bowel is tied up and a fluid diet is ordered, but in the majority of cases early operation is demanded because mortality is very high when surgical intervention is delayed until peritonitis supervenes.

Morphin may be administered to relieve pain and court sleep where the patient declines operation, and while he is being made ready for it after a diagnosis has been made, but otherwise is contraindicated because it masks symptoms.

The ice coil is serviceable for reducing temperature and hot fomentations diminish muscular rigidity and pain, and the employment of a saline solution subcutaneously or by the Murphy rectal drop method helps sustain the patient prior to and during operation and reinvigorates him and prolongs life where considerable blood has been lost as a result of injury or operation.

Contused wounds of the abdomen are treated as similar lesions elsewhere—trimming off rough and bruised edges, cleansing, draining, and closing the wound.

Surgical Treatment of Intestinal Wounds.—Usually an idea of the location of an intestinal injury is gained by inspecting the position and character of the abdominal wound, but when perforation or laceration has been caused by ulceration, air distention, or foreign body within the bowel, it is impossible to determine which segment of gut is involved unless the intestine is exposed, preferably by a free median incision.

The injured intestine is brought into view and isolated, following which the abdominal cavity and viscera are cleansed of blood and feces with the aid of gauze wipes and saline irrigation. After viscera has been protected with gauze handkerchiefs irregular and severely traumatized edges of the intestinal rent are trimmed off with scissors to facilitate union and prevent subsequent necrosis and sloughing.

Bullet punctures and diminutive openings are readily repaired by *purse-string sutures*; larger tears and long incised wounds are effectively closed by a *through-and-through reinforced by Lembert sutures*, and less extensive injuries are satisfactorily disposed of by *infolding linen stitches*.

Where the gut is extensively ruptured, severely traumatized, or its mesentery has been injured, the involved segment is *excised* and gut ends approximated by circular enterorrhaphy or lateral

anastomosis, using sutures alone, or Murphy's button in urgent cases. When several rents are encountered near each other, a lengthy piece of bowel is removed to avoid multiple resection.

Following repair of gut injuries and wounds in other viscera the omentum is taken care of, and openings in the peritoneum are closed or covered.

Intestinal exclusion is seldom indicated in this class of cases, but *colostomy* is frequently practised where the gut is extensively injured, the patient has peritonitis, or is unable to withstand a long operation; under such conditions the gut may be immediately excised and glass or rubber drainage-tubes be inserted, or the bowel may be sutured in the wound and opened later.

Occasionally repair of the skin and abdominal muscles is imperative, but this is attended to following the intestinal work.

Postoperative treatment consists chiefly in cleansing the abdominal wound, restricting the diet to fluids, prescribing morphin to ease pain or belladonna to lessen muscular rigidity, administering broken doses of Epsom salts or castor oil as required, removing drains when danger from infection is past, and in keeping the patient quiet.

PROGNOSIS

The prognosis is good in abdomino-intestinal injuries where the skin and deeper abdominal structures have been slightly or markedly traumatized, and the bowel has not been seriously injured; but when the intestine has been punctured or ruptured the prognosis is grave, for in such cases peritonitis frequently ensues and causes death or troublesome abscess or fistula.

Where laceration is partial and the mucosa remains intact, suffering is slight and recovery promptly follows repair of the tear, but incomplete intestinal perforation or rupture is fatal in about 95 per cent. of unoperated cases. Far better results are obtained when the rent is repaired within four hours, since the mortality is more than 50 per cent. where surgical intervention is delayed for twelve hours or longer.

A spontaneous cure occasionally follows bullet and small penetrating gut wounds because leakage is slight and danger of peritonitis is minimized, owing to the small openings and their partial blockings by the mucosa which projects into them.

Small intestinal are fatal more frequently than similar injuries involving the colon, sigmoid flexure, or rectum.

Stevenson's report on intestinal gunshot injuries shows 37.1 per cent. for wounds of the small intestine (35 cases), and 67.1 per cent. recoveries where the large bowel was injured (40 cases).

Patients with intestinal wounds complicated by extensive adhesions, stricture, or fecal fistula do not fully recover until these conditions have been corrected by operation.

Summary of the Author's Cases of Injury to the Small Intestine, Colon, and Sigmoid Flexure.—The author has treated 63 cases of anorectal injury elsewhere, and a considerable number involving the small intestine, colon, and sigmoid flexure.

There were five types of injury affecting the small and large intestine: those caused by (a) external violence, (b) abdominal operation, (c) foreign bodies within the gut, (d) pathologic lesions—ulcers, cancers, etc.—and (e) stercoral ulcers resulting from constipation and fecal impaction or chronic intestinal obstruction.

The author has encountered but few injuries induced by abdominal contusions, knife thrusts, being shot, run over or crushed by machinery, or falling from a height. These patients are usually rushed to a hospital or placed in the hands of a general surgeon for immediate operation.

Below the author has epitomized his cases of injury concerning the small intestine, colon, and sigmoid flexure:

1. Complete rupture of a cancerous sigmoid flexure during resection.
2. Vesicosigmoidal rent made while performing abdomino-perineal proctectomy.
3. Extensive laceration of syphilitic colon that occurred while establishing an artificial anus.
4. Extensive laceration of a tubercular sigmoid and mesentery during resection.
5. Colonic injury and fecal fistula resulting from sigmoidal extirpation.
6. Sloughing of sigmoid and fecal fistula from crushing tissues with forceps during operation.
7. Large incised cecal wound made by physician while approaching the appendix.
8. Rupture of tubercular ileum while separating adhesions.
9. Perforation of sigmoid flexure by sigmoidoscope during examination.
10. Rupture of sigmoid—ulcerated—by pneumatic inflation during sigmoidoscopic examination.
11. Rupture at strictured rectosigmoidal juncture induced by the introduction of Wales' bougie.
12. Punctured colon from knife thrust.
13. Contusion of abdomen and laceration of sigmoid from falling from a window on to the corner of a box.

14. Extensive colonic rupture and subsequent sloughing from abdominal contusion caused by wagon tongue.
15. Perforation of the cecum by bullet.
16. Rupture of the rectosigmoidal juneture induced by divulsion with Pratt's speculum.
17. Perforation of colon by swallowed horseshoe nail.
18. Rupture of colon from gas and fecal distention incident to cancerous obstruction.
19. Rupture of ileum in neoplastic ileocecal tuberculosis with obstructive distention.
20. Long linear tear in transverse colon from fecal accumulation incident to megaeolon.
21. Perforation of sigmoid from stereoral ulcers secondary to chronic fecal complicating carcinomatous obstruction of sigmoid.
22. Rupture caused by the discharge from a diverticulum.
23. Perforation of cecum by tubercular ulceration.
24. Perforation of sigmoid by uterine carcinoma.
25. Perforation of sigmoid by an amebic ulcer.
26. Rupture at splenic flexure from carcinomatous ulcers with fecal impaction.
27. Perforation of small intestine caused by typhoid ulcer.

Illustrative Cases.—The most interesting abdominorectal injury treated by the author was that of a wealthy man who fell upon and drove an iron rod $\frac{1}{4}$ inch (6.35 mm.) thick and 10 inches in length (25.40 cm.) (Fig. 172), that supported the head-board of a cot, through the rectum and peritoneum into the abdominal cavity. A friend, in attempting to relieve him, jerked out the rod, which had a hook on the end, making a large rent in the pelvic peritoneum, extensively lacerating the rectum and levator ani muscle, and completely severing the sphincter.

A prominent surgeon was called in, sutured the wound without drainage, and ordered small doses of magnesium sulphate daily. By end of the third day the wound was infected throughout and the patient suffered from peritonitis. For some reason the surgeon was then discharged, and I was called in and was fortunate in saving the patient's life by cutting all sutures, irrigating the parts, and inserting drains into the peritoneal and anal extremities of the wound.

The patient recovered completely after a lengthy convalescence, healing taking place by granulation, though at first it was thought that he would permanently suffer from fecal incontinence. Perfect control over movements was obtained, though both sphincters and the levator ani were lacerated by the injury.

The author was consulted regarding, but did not treat, another patient, who while scratching to relieve pruritus fell upon a lengthy, knotted, sharp-pronged stick, several inches in length and more than $\frac{1}{2}$ inch (12.70 mm.) thick.

Repeated attempts were made to remove the foreign body by pushing it upward and then withdrawing it, which failed, because the pointed hook repeatedly caught in the bowel. Finally, the family physician succeeded in extracting the stick, but in doing so tore a large hole in the peritoneum; three days later the patient died of peritonitis because no attempt was made to repair the injury or drain the peritoneal cavity.

Chapter LXIII

Foreign Bodies in the Colon, Sigmoid Flexure, and Rectum

THE proctologist is frequently called upon to remove foreign bodies from the rectum or repair injuries to the anal canal resulting from their evacuation.

Hundreds of amusing, interesting, and curious cases have been reported concerning foreign bodies encountered in the small intestine, colon, sigmoid flexure, and rectum.

The author groups intestinal foreign bodies into those:

1. Swallowed.

2. Introduced per anum.

3. Formed within the intestine and other organs.

4. Reaching the bowel through violent injuries.

5. Reaching the intestine by way of the abdomen or other viscera.

Foreign bodies that have been swallowed are encountered in the rectum more frequently than those introduced in other ways. Such objects may be accidentally or intentionally swallowed by children or grown persons while eating, drinking, playing with some object, or holding tacks, nails, pins, or curtain hooks in the mouth while working.

Foreign bodies varying in kind, size, shape, density, and composition (Fig. 677) have been swallowed, the majority of which have not produced symptoms, while others caused slight discomfort, intense pain, serious injury to the gut, or perforated the intestine, causing dangerous complications or death.

Surprisingly large, long, and irregular-shaped bodies sometimes readily pass through the gastro-intestinal tract without hindrance, and small, pointed, and larger edged substances are often evacuated without injuring the bowel. Usually a foreign body that passes the esophagus is transported through the remainder of the alimentary tract without difficulty.

Named from above downward, the points of most difficult passage are the *esophagus*, *pyloric orifice*, *duodenum*, *ileocecal valve*, *hepatic*, *splenic*, and *sigmoid flexures*, *rectosigmoidal juncture*, *Houston's valves*, *anal canal*, *Morgagni's crypts*, and the *sphincter muscle*; but in the majority of instances foreign bodies become blocked or lodged in the lower inch of the rectum, usually at the sphincteric juncture.

Pointed and sharp objects seldom injure the bowel because they catch and are covered by feces, while small smooth foreign bodies—gall-stones, buttons, coins, marbles, etc.—often induce obstruction by acting as a nucleus around which feces collect.

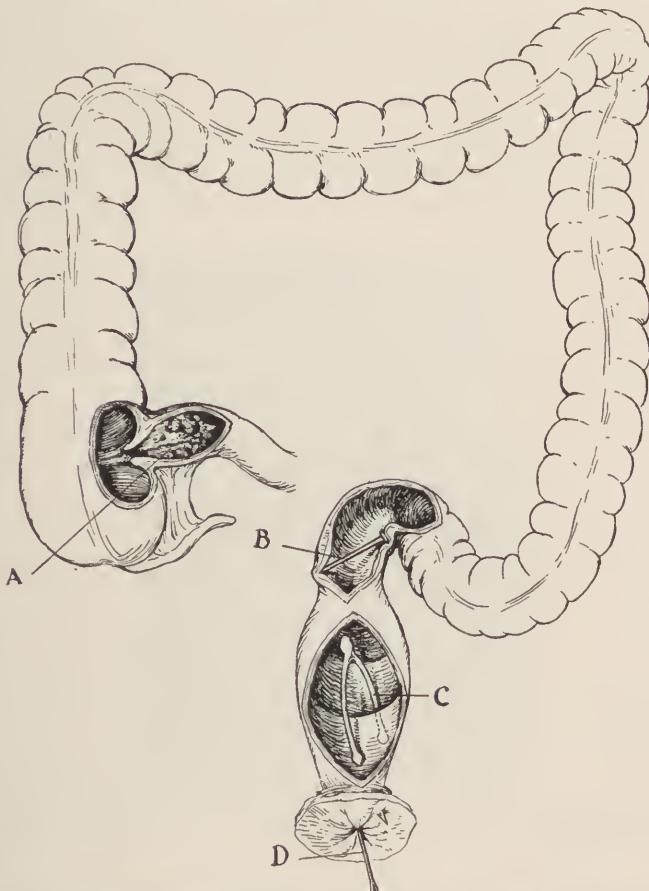


Fig. 677.—Schematic drawing showing the types and locations of foreign bodies removed from the small intestine, sigmoid flexure, rectum, and anal canal in 4 of the author's cases: A, Peach stone covered with concretions causing obstruction at the ileocecal valve, removed by enterotomy; B, round wire nail caught at the rectosigmoidal juncture, extracted through a sigmoidoscope with the author's special forceps (Fig. 682); C, wish-bone of chicken lodged beneath mucosa of the middle rectal valve, removed through a proctoscope with forceps after it had been divided with scissors; D, fish-hook caught in the lower extremity of the anal canal, liberated by incising the lower rectum, sphincter, and skin.

Knives, sticks, forks, and other lengthy foreign bodies may traverse the intestine without hindrance unless they change their direction and catch in a fold of mucosa, or cause intestinal laceration, angulation, or perforation.

Children frequently swallow needles, toys (Fig. 678), buttons, safety-pins, coins, jackstones, thimbles, cockle burrs, slate pencils, beads, whistles, nipples, rings, and other small objects.

Dressmakers, carpenters, carpet layers, and locksmiths occasionally swallow pins, nails, and other objects held in the mouth while working. Sometimes thieves, smugglers, prisoners, and insane persons conceal money, jewelry, coins, tools, keys, papers, counterfeit notes, glass, knives, hairpins, and other objects by swallowing or introducing them into the rectum to hide evidences of their crime, or that they may have necessary implements with which to escape or kill themselves should emergency arise.



Fig. 678.—Swallowed lead toy horse (A) in the cecum. (Radiographed at Broad Street Hospital.)

Individuals have been compelled to swallow foreign bodies by jokers, through revenge, and as a punishment for crime or being mischievous.

All sorts of foreign bodies—nails, knives, tacks, glass, etc.—have been removed from the stomach and intestines of individuals who made a living by exhibiting themselves, and eating glass or swallowing objects of various kinds for small pay. The author has known 2 men who did this, both of whom died eventually from intestinal or gastric perforation and peritonitis following injuries caused in this way.

Foreign Bodies Introduced Through the Anus.—Foreign bodies

variable in size, character, and contour have been introduced into the intestine or rectum (*a*) for purposes of concealment, (*b*) by practical jokers and for revenge, (*c*) with murderous and suicidal intent, (*d*) as a method of punishment, (*e*) during examination or treatment, and (*f*) for the purpose of exciting sexual passion.

A correct diagnosis is seldom made in this class of cases because the patient is embarrassed, and will not give accurate information as to how the foreign body came to be in the bowel.

Foreign Bodies Introduced for Purposes of Concealment.—Insane individuals have concealed all sorts of objects in the rectum, having an exaggerated notion of their value or vague idea they would prove useful for injuring some one upon whom they wished to be avenged, helping them to escape, or to kill themselves should occasion arise.

Diamond miners, jewelry clerks, and thieves have many times concealed diamonds, jewelry, other valuables, coins, banknotes, or incriminating evidence in the rectum, and in the same manner prisoners have often hidden saws, jimmies, files, knives, nails, and other implements with which they hoped to escape or commit suicide. Dope fiends are said to have hidden tubes of morphin and cocain in the rectum that their keepers might not find it, so they could recover it when desired. A Chilean miner concealed a piece of silver ore in the rectum measuring $5\frac{1}{2}$ inches (13.97 cm.) in length and $8\frac{1}{2}$ inches (21.59 cm.) in circumference, and weighing over 8 ounces (250.0). An interesting case was one where a cylindric-shaped box, 6 inches (15.24 cm.) long and 5 inches (12.70 cm.) broad, weighing 22 ounces (660.0), containing thirty different varieties of tools, was removed from the transverse colon of a convict who had concealed it in the rectum.

Foreign Bodies Introduced by Practical Jokers and Individuals Seeking Revenge.—Potatoes, carrots, apples, pears, a goblet, glass bottles, jewelry, and other foreign bodies, variable in size and shape, have been inserted into the rectum of sleeping or drunken individuals by persons playing a joke or seeking revenge upon them for a fancied or real wrong.

Marchetti reports a case in which some students, while on a lark, held a prostitute and introduced into her rectum all except the small extremity of a frozen pig's tail, the bristles of which had been cut short so as to make it as rough as possible; various attempts to remove it failed, owing to bristles catching in the mucosa, finally Marchetti succeeded in slipping a cannula over it, which protected mucous membrane and enabled him to remove it without further difficulty.

A man introduced into the vagina of his intoxicated companion a goblet $2\frac{1}{2}$ inches (6.35 cm.) in diameter and $3\frac{1}{2}$ inches (8.89 cm.) in length. Later, while he was drunk and under the influence of opium, the prostitute, to get revenge, pushed the goblet and an opium pipe, having a stem 18 inches (45.72 cm.) long, into his rectum; in both instances the foreign bodies were safely removed.

A farmer withheld some change while being robbed by tramps, who, when they found it out, knocked him down and forced a turnip into his bowel, which was successfully extracted after considerable difficulty.

Foreign Bodies Introduced Into the Rectum with Murderous or Suicidal Intent.—When one stops to consider how quickly morphin, cocain, and other deadly drugs are absorbed in the rectum, and how easily a hairpin, long narrow-bladed knife, and other dangerous implements could be pushed through the anus and upward into the peritoneal cavity, and be withdrawn without leaving evidence of violence, it is remarkable that such methods of committing murder or suicide have not been more frequently taken advantage of.

It is a matter of record that Edward II was killed by having a red-hot iron thrust into his rectum.

A relative to inherit the property of a rich young boy killed him by introducing the heads of phosphorus matches into his rectum, which were absorbed and caused death in a few hours.

Criminals, political prisoners, and insane persons have attempted or committed suicide by forcing knives, forks, pieces of wire, glass, stones, sticks, and other foreign bodies into the lower bowel.

Foreign Bodies Introduced Into the Rectum as a Method of Punishment.—Instances have been recorded where vegetables, stones, hot mud, and other foreign substances were placed in the rectum as a punishment for *petit* crimes and to make difficult the escape of criminals while being transferred from one prison to another.

Foreign Bodies Introduced During Examination or Treatment.—Specula, metal and wooden applicators, copper and silver sticks, knives, hypodermic needles, probes, broken knife blades, and other instruments have at many times escaped into or penetrated the rectum during examination or operation, and whole or pieces of metal, hard rubber or glass, syringe nozzles, and irrigating tubes have been broken off or left in the bowel during irrigation or administration of enemata. The author has twice treated patients

as a result of such accidents, causing peritonitis and abscess. Cases have also been recorded where broken thermometers, anal dilators, specula, and bougies have been recovered from the rectum.

On several occasions pieces or whole toothpicks or wooden throat applicators have been broken off by the sphincter, or escaped into the rectum through proctoscopes during treatments made by the author and others, but with the patient in the knee-chest posture, and aid of reflected light, a pair of forceps, and a suitable proctoscope he has in each instance extracted them without harm, and on two occasions broken off pieces of silver nitrate sticks were recovered before they injured the patient.

During an examination by the author the handle came off and a 6-inch proctoscope slipped into the rectum; owing to the sharp edges of the instrument its removal was not attempted until the patient had been quieted by gas, when the sphincter was dilated, and it was quickly extracted with forceps.

Many interesting cases are recorded of foreign bodies introduced into the rectum by persons while treating themselves for different ailments.

A monk, to relieve himself of colic, pushed a large bottle containing Hungary water into the bowel, which, after many efforts, was finally removed by a small boy, who introduced his hand into the rectum and withdrew it.

A stone $5\frac{1}{4}$ by 3 inches (13.34 x 7.62 cm.) was removed through the abdomen of a sailor, who attempted to relieve constipation by stretching the anus with it.

A large piece of wood was extracted from the rectum of a man who used it to prevent fecal incontinence.

In Bengal natives sometimes place dry clay plugs in the rectum to stimulate a movement when constipated, and to prevent frequent evacuations when they suffer from diarrhea. A ten-pin 2 inches (5.08) wide and 10 inches (25.40 cm.) long, used by a laborer to relieve constipation, slipped into the rectum. It was removed under general anesthesia by withdrawing the large end first. A peasant thought to avoid the necessity of eating by blocking the rectum, and as a result his abdomen was opened and a wooden plug was removed from the sigmoid flexure.

Many other authentic cases could be enumerated of ignorant persons who introduced all sorts of foreign bodies into the rectum to arrest diarrhea, cure constipation, prevent the protrusion of polyps, prolapsed recti, or hemorrhoids, and to relieve bleeding or relieve intense itching incident to pruritis ani. Pile and procidentia recti supporters have also been known to escape into the bowel.

Foreign Bodies Formed Within the Intestine and Other Organs.—Intestinal *calculi* and *concretions* have frequently been encountered in the small intestine, colon, and rectum, but seldom produced symptoms except when large and angulated, or they acted as a nucleus about which fecal matter collected.

Enteroliths usually form in the bowel, and biliary, pancreatic, urinary (Fig. 686), and prostatic calculi occasionally find their way into the intestine.

Gall-stones, hairy concretions—bezoars—(Fig. 684), avcnoliths—oat stones—intestinal calculi (Fig. 685) and concretions, variable in size and shape, composed of fruit stones and peels, berry seeds, wooden and cloth fibers, hair encased in a hard coating of fecal matter, are the most common types of intestinal foreign bodies not swallowed or introduced through the anus. Small coins, marbles, etc., have also acted as nuclei around which feces have collected and formed bodies of considerable size. Occasionally tape- and lumbricoid worms become entangled, accumulate in large ball-like masses, causing obstruction and other distressing manifestations.

For further information regarding this subject the reader is referred to Chapter LXIV, devoted to enteroliths and intestinal concretions.

Foreign Bodies Introduced to Excite Sexual Passion.—*Rectal onanism—masturbation*—is occasionally practised by men having lost their sexual power or who have been prevented from having normal intercourse. Sexual gratification to a certain degree may be obtained in this way, and rectal masturbators and *passive pederasts* seldom forego their degrading habits. The practice is more common than the number of reported cases indicates, for rectal masturbators are ashamed and will not admit having indulged in the offensive practice except when in great distress. Candles, bottles, bougies, canes, broomsticks, instruments, and other long, round, smooth objects have been used for the purpose and have at times been broken off or escaped into the rectum, supposedly when orgasm was at its height. Warren's case is of unusual interest. In this instance the sexual pervert used a catsup bottle measuring 9 inches (22.86 cm.) in circumference (base) and 10 inches (25.40 cm.) in length, which slipped into the bowel neck end first; following several futile attempts the bottle was removed with the fingers aided by forceps, after the lower rectum had been split to make room.

Foreign Bodies Reaching Intestine by Way of the Abdomen or Other Viscera.—Occasionally foreign bodies in the abdomen or

viscera enter the bowel through a puncture, pressure necrosis, or ulceration, with or without forming a fecal fistula. Such accidents have most frequently resulted from leaving ligatures, drainage-tubes, sponges, knives, needles, scissors, forceps, gauze, or cotton in the abdomen during operations that caused ulceration or abscess and perforation, permitting them to escape into the bowel.

Payne reported a case of congenital absence of the vaginal orifice where, after thirty-six hours of labor, a child's head presented at the anus, and the infant was successfully delivered with forceps by way of the rectum.

A French girl who had no vaginal orifice indulged in *pederasty*, became pregnant, and at term gave birth through the rectum to a well-formed child.

Several cases have been recorded where, as a result of ruptured uteri, extra-uterine pregnancy, or dermoid cysts, the fetus, bones, or skull were evacuated through the anus.

L. H. Adler extracted the bones of a skull from the rectum (Fig. 680), but owing to their size he was compelled to etherize the patient and break them up so they could be removed without lacerating the bowel. The patient made an uneventful recovery.

The author presented at the meeting of the American Proctologic Society, 1900, a urinary calculus weighing 4 ounces (125.0), which had ulcerated through the rectovesicle septum and caused stricture of the rectum.

Ivory, metallic, and hard-rubber ring and ball pessaries have occasionally ulcerated into the rectum. Bullets fired into the abdomen, without apparent injury of the gut at the time, have in one or two instances been evacuated through the anus.

Foreign Bodies Introduced Through Violent Injuries.—In this class of cases the foreign body may be a bullet, shrapnel, machinery, metal paling, piece of wood, bottle, or glass which has penetrated the small intestine, colon, or rectum as the result of a shot, explosion, or the patient's having fallen, or sat upon the branch of a tree, picket fence, bottle or other glass object, or something which has broken off and remained in the bowel. Usually foreign bodies of this class are of considerable size, have an uneven contour or ragged edges, are difficult to remove, and frequently cause dangerous hemorrhage, and sometimes peritonitis. The author has treated 2 patients who slipped and drove lengthy irregular-shaped pieces of wood into the rectum while scratching themselves to relieve pruritis ani, one of whom died.

Another patient slid from the top of a hay-stack and landed upon the upturned prong of a pitch-fork, which was broken off in

the rectum. Another instance was that of a young man who fell from a cherry tree, upon a paling, which was shattered, leaving fragments of wood in the rectum and buttocks.

Another of his cases was that of a man who during a runaway was thrown upon a tongue-like piece of the dashboard of a wagon, about which the lines were tied, which was broken off and remained sticking in the rectum.

In this series of cases tears were extensive, bleeding profuse, and the urethra was punctured in one and the bladder in another instance.

The author also treated a man that was shot by a policeman, where the bullet entered the anus, passed upward through the rectum, and escaped in the right groin.

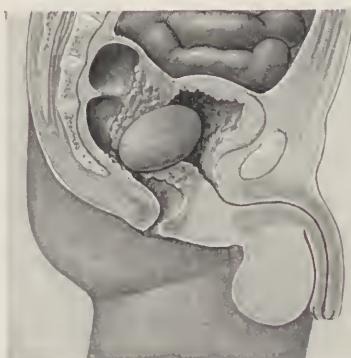


Fig. 679.—Vesical calculus that ulcerated through the septum causing rectovesical fistula, rectal stricture, and obstipation. The stone was extracted after several attempts with strong forceps made following splitting of the perineum and sphincters.

An interesting recorded case was that of a farmer who fell upon a cow's horn, which was driven completely into the rectum.

Many other interesting cases have been published where various bodies have been accidentally forced into the rectum.

Foreign Bodies Removed from the Small Intestine, Colon, and Rectum.—The author will now give a variegated, but not complete, list of foreign bodies that have been removed from the bowel by physicians: *fish, chicken, and other bones* (Fig. 677), *coins, buttons, nails* (Fig. 677), *door knobs, electric light bulb, pocket knives, tacks, syringe nozzle, pieces of bark, needles, pins, darning needles, safety-pins, beads, whistles, rings, pocketbooks, corncobs, slate and lead pencils, pieces of metal, glass, crockery, jewelry, toothpicks, hairpins, fish scales, fruit peels, seeds and stones* (Fig. 677), *nuts of all kinds, pepper box, soap, oyster shell, medicine, jelly, wine,*

water and beer glasses, small and large bottles, lamp chimneys, spools of thread, bristles, matches, roller bandages, silver knives, forks, and spoons, valve clamp, preserve jar, compass, bougie, false teeth and plate, wooden and metal splinters, goblets, artificial eyes, frozen pig tail, screws, knitting needles, steam radiator valve, toy horse (Fig. 678), teapot, cow's horn, cylindric box of burglars' tools, apples, carrots, potatoes, sticks, gall-stones, enterolith (Fig. 685), avenoliths, fecal, pancreatic, and vesical calculi (Fig. 679), skull bones (Fig. 680), clay plugs, scissors, forceps, ligatures, gauze and surgeons' needles, pair of suspenders, long bar of lead, pieces of lead, wood, concretions of shellac, fountain pen, portion of a cane, children's building blocks, etc.

SYMPTOMS

Foreign bodies vary in size, shape, and consistence, and have been swallowed without causing any disturbance, but as a rule they induce discomfort at some point along the alimentary canal. Rough, pointed, and angulated objects cause pains that begin high up, increase and change their location as the bodies approach the anus. Tenderness and pain are more marked when foreign bodies are caught, remain in a particular segment of gut for a considerable time, and incite enterospasm, which in turn blocks the bowel, causing fecal impaction and gas distention.

Gall-stones, coproliths, buttons, pieces of metal, etc., around which feces collect, and large round and irregular-shaped foreign bodies partially or completely occlude the bowel and bring about manifestations of obstruction, loss of appetite, constipation, nausea, ordinary or fecal vomiting, tympanites, colic, muscular rigidity, abdominal tenderness, high temperature, fast pulse and tenesmus, and mucous evacuations. When the foreign body is caught in the rectum patient complains of bearing-down pains, unrelieved feeling following defecation, and constant desire to stool. Fecal impaction is a common complication, and fecoliths must be differentiated from foreign bodies whether in the rectum or colon.

Sharp irregular or rounded bodies may lacerate the gut or induce pressure or ulceration, evidenced by mucoid, bloody, or purulent evacuations alone or admixed, and perforation complicated by peritonitis. Abscess and fecal fistula are complications of perforation caused by a foreign body or stercoral ulcer.

Pointed, edged, and irregular-shaped foreign objects usually lodge in the anal canal above the sphincter and the patient constantly suffers from tenesmus, sphincteralgia, constipation, painful defecation, difficult micturition, and bleeding.

When foreign substances become encysted the sphincter and levator ani muscles are irritable, hypertrophied, and add to the patient's suffering through frequently contracting.

Now and then encysted foreign bodies lead to infection and the formation of perianal or perirectal abscess and fistula, and occasionally needles, spicules of bone, pieces of glass, etc., pass through the bowel and work their way to the surface or into another viscus at a point distant to the original injury.



Fig. 680.—Pieces of skull removed from the rectum (Adler).

Foreign objects may cause distention, tearing, pricking, or lancinating pain, according to their shape as they descend along the gut, or as evacuated, and discomfort may begin immediately or a considerable time after they have been swallowed or introduced into the rectum. Pain may be continuous or interrupted, but is aggravated by defecation when the body is lodged in the anal canal.

Itching unrelieved by scratching is the most annoying symptom complained of where seeds, fruit stones, fecoliths, fish bones, and other small objects are caught in or beneath the mucosa.

Objective signs and symptoms are sometimes present, the sphincter is irritable and contracted, there is an outward bulging of the rectum, buttocks, and perianal skin, the foreign body may be partially extruded or be seen projecting through the perianal skin, blood trickles through the anus, and adjacent skin is swollen, cyanotic, edematous, or smeared with a mucopurulent discharge.

The complications caused by foreign bodies in the small intestine, colon, or rectum may be unimportant or serious, of which the following are most frequent: hemorrhage, laceration of the bowel, perforation, peritonitis, abscess, ordinary and fecal fistula, necrosis, sloughing, stricture, adhesions; pericolitis and periproctitis, proctitis, cryptitis, painful defecation, vesicle disturbances, hypertrophy of the levator ani or sphincter muscles, inflammatory tumors, indurated tissue, procidentia recti incident to straining, and rectovaginal or vesical fistula.

From what has been said the reader will understand that in so far as the symptoms and diagnosis of foreign bodies in the colon and rectum are concerned, each case is a law unto itself.

DIAGNOSIS

Frequently it is impossible to definitely determine if there is a foreign body in the small or large intestine because it may induce symptoms simulating those of other affections, but an idea may be formed as to the nature of the trouble by ascertaining if the patient has swallowed or had any foreign object introduced into the rectum, suffered from gall-stones, been in the habit of swallowing fruit stones, hair, or pieces of toothpicks, cloth—hookworm victims—or makes a practice of swallowing glass, nails, knives, swords, coins, etc., for exhibition purposes, or holding tacks, nails, curtain hooks, pieces of metal, etc., in the mouth while working.

One must ascertain if the sufferer is insane, a thief, or degenerate, for such individuals have swallowed or introduced into the bowel small or large foreign bodies during fits of rage or to conceal them.

In the absence of symptoms indicating local disease of the bowel the diagnosis is not difficult where the victim admits swallowing a foreign body and location of pain changes with its passage downward through the bowel, and when the patient complains of localized tenderness, pain, and obstruction in a given segment of gut.

Occasionally foreign bodies are felt through the abdominal wall, but their location and form is determined more accurately by fluoroscopic examination and radiographs, since they are usually composed of bone, metal, stone, or other opaque substance.

Exploratory laparotomy may be required to clear up the diagnosis, for in numerous instances foreign bodies have reached the gut by way of the mouth or rectum unknown to the sufferer.

Fecal tumors are distinguishable from foreign bodies by their contour, *indentability*, and tendency to be broken up and evacuated by soapsuds or peroxid of hydrogen injections, and *carcinomata* are differentiated by their fixed location, cachectic and emaciated state of the patient, constipation, and abundant discharge of pus, blood, and mucus.

Foreign bodies in the rectum and anal canal are easy to diagnose except when small and encysted or concealed in or beneath the mucosa. Large and small foreign bodies which have obtained considerable size through the collection of inspissated feces around them cause pressure pains, incessant desire to evacuate the bowel, and straining during defecation, while pointed, edged, and angulated objects lodged in the anal canal induce lancinating pain or pricking sensations, difficult and painful defecation, and incite spasms of the sphincter and levator ani muscles.

A diagnosis is obvious or easily made where a foreign substance extrudes, causes the anus to bulge outward, induces procidentia through straining, or pierces the skin of the perianal region.

Foreign bodies in the rectum or anal canal are quickly detected and their contour accurately determined by digital examination, and large objects may be defined through the vaginal wall. Foreign substances lodged in the sigmoid or upper rectum are located and studied through the sigmoidoscope; the proctoscope and anoscope are useful for detecting small objects—fish bones, seeds, pins, etc.—caught in ulcers or folds of the mucosa, for with them and a suitable light the entire rectum can be accurately examined as the instrument is slowly withdrawn. During instrumental examinations unsuspected foreign bodies have been located that were swallowed months or years previously.

Where the patient gives a history of having swallowed a foreign body—piece of glass or fish bone—or being injured by the breaking off of an irrigating tube, and suffers from acute constipation, localized sharp pain, abscess, or fistula in the perianal region or abdomen, one should suspect a foreign body and operate with the object of locating and removing it.

Occasionally worms collect *en masse* and block or irritate the intestine; in such cases the finding of worms, their segments or eggs in the stools, point to helminths as the cause of the trouble.

When a foreign body is believed to be in or adjacent to the bowel the patient should be fluoroscoped and radiographs made,

because in some instances the location, shape, and consistence of *wandering* foreign bodies cannot be determined in any other way.

TREATMENT

In the majority of cases foreign bodies in the bowel are easily removed because they are free and located within reach of the finger or inspection through the proctoscope. Occasionally small and large bodies surrounded by fecal concretions have formed, are harmlessly evacuated with the aid of massage, catharsis, and oil or soapsuds enemata, but when they are firmly lodged cause sharp pain and incite sphincteric contractions, palliative measures are unsatisfactory.

Foreign bodies located in the small intestine, colon, or sigmoid flexure that lacerate the gut, induce serious hemorrhage, induce intestinal obstruction, or cause perforation and peritonitis, abscess, shock, fecal fistula, and other serious manifestations are removed through the abdomen by *enterotomy*, *colotomy*, or *sigmoidotomy*. In such cases the gut wound is closed by through-and-through reinforced by Lembert linen sutures, a cigarette drain being inserted if indicated.

When a foreign body surrounded by inspissated feces has induced deep stercoral—pressure—ulcers or extensive sloughing the bowel is brought outside, the foreign body removed, and the involved segment of gut *resected*, following which bowel ends are anastomosed or sutured to the skin to form an artificial anus—*colostomy*—leaving continuity of the bowel to be re-established by a secondary operation.

Generally foreign bodies in the rectum are easily removed, but occasionally this is difficult or impossible owing to irritability or narrowing of the anal canal and hypertrophy of the levator ani or sphincter muscles, which spasmodically occlude the lower rectum. Under such circumstances the muscle or constricted anal canal is infiltrated with a $\frac{1}{8}$ of 1 per cent. eucain solution, and divulsed, or preferably divided with a blunt-pointed bistoury to make additional room and facilitate removal of the body.

Gall-stones, coproliths, enteroliths, concretions, and large or small fecal masses composed of fruit seeds, stones or peel, hair, wood fiber, cloth, and marbles, coins, and other round, oval, or oblong bodies are easily caught and extricated with the author's strong forceps (Fig. 682), or by hooking one or two fingers over and withdrawing them through the anus after widening the rectal outlet when necessary.

Loose, straight, sharp-pointed, or edged foreign bodies are

exposed, detached, and withdrawn through a proctoscope, or when caught by seizing them with forceps, pushing them up the bowel until their lower end is detached, and then delivering them through the anus.

The author recently removed in this way several large pieces of a glass high-frequency tube that had exploded.

Jagged, pointed, hooked, and irregular-shaped pieces of bone, metal, or glass; fish bones, safety-pins, fish hooks, or tacks penetrate the mucosa or into deeper structures of the anal canal, and their extraction is impossible or attended by exruciating pain unless considerable ingenuity is exercised. In such cases the author eucainizes and divulses or splits the anal canal to obtain necessary room, frees and extracts the offending body with knife or scissors, dissections and forceps, and completes the operation by packing the wound with gauze to arrest bleeding and provide drainage.

Occasionally general anesthesia has been required where a fish bone, needle, piece of glass, or other edged or pointed foreign body perforated the bowel and escaped into the perirectal structures. Such objects not located by radiographs are detected through palpation of tender areas, indurated spots or fistulous sinus leading to them when encysted.

Minor or major dissections may be required before the offending object is isolated and extricated, since they may remain stationary or migrate during operation like a needle point in the finger. Where a deep, ragged wound has been made, it is smoothed up and connected with the skin by a free incision, including the sphincter when necessary to provide free drainage, while clean incisions not connected with the rectum do not require a drain and are closed by sutures.

The removal of irregular-shaped pieces of metal—tin, lead, etc.—is accomplished by cutting into strips or bending and rolling them into compact masses with forceps through the proctoscope before an attempt is made to extract them. Children's building blocks and other wooden objects have occasionally been removed with a gimlet following splitting or divulsion of the anal canal, which greatly facilitates their delivery.

Medium-sized and large foreign bodies having angulated, pointed, edged, hooked, or bifurcated extremities (Fig. 677) are very difficult to extract without puncturing, rupturing, or extensively lacerating the bowel during their removal.

The author knows of 2 deaths from peritonitis, one rectovesical and one recto-urethral fistula, and several abscesses caused in this way. Following division of the sphincter and structures back to

the coccyx large irregular-shaped bodies are harmlessly removed by covering sharp edges with the right while the foreign body is being withdrawn by fingers of the left hand.

Long, narrow, pointed, or jagged objects are extracted in like manner, or by carefully introducing and adjusting a large proctoscope about them, which protects the bowel from injury during their withdrawal with forceps.



Fig. 681.—Schematic drawing illustrating manner in which the author removed a pin buried beneath mucosa of the rectal ampulla with the aid of proctoscope and forceps having bent handles that did not obstruct his view: *A*, Encysted pin; *B*, pin caught with forceps, pushed upward, and dislodged, so it could be harmlessly withdrawn through the proctoscope.

The removal of large rounded, smooth, or rough foreign bodies—impacted feces, enteroliths, concretions, etc.—that cannot be delivered intact is facilitated by crushing or dividing them with pressure forceps, following which they are brought away with a spoon, fingers, or copious oil or soapsuds enemata. Now and then enteroliths, bismuth, and fecal masses (Fig. 937) and other bodies are expelled from the rectum through downward pressure made upon them with fingers in the vagina.

Small pieces of glass, pins (Fig. 677), nails, and crockery are

dissected out if caught in the mucosa, but when loose they are seized with forceps and removed through a proctoscope (Fig. 681), but when this cannot be accomplished because of their large size, they are broken into smaller pieces with pressure forceps and delivered singly with or without division of the sphincter.

Apples, pears, potatoes, turnips, and other large soft bodies are most quickly evacuated by boring a hole through and dividing them into segments with knife or scissors, then washing them out with an oil or soapsuds enema through a large proctoscope.

Foreign bodies having bristles, splinters, or rough spots are prevented from damaging mucosa by encompassing them with plaster of Paris, gelatin, gauze, or cotton before attempting their extraction. The covering of forked prongs, points of nails, pins, and tacks with putty, cork, or rubber forestalls pain and possible injury to the rectum during extraction. Large strips of tape, gauze,



Fig. 682.—Author's special forceps designed for extracting free and encysted foreign bodies located in the sigmoid flexure and rectum, removing tissue for examination, and making topical applications.

twine, bandages, etc., are removed *en masse* or unraveled with fingers, but when small they are removed through a proctoscope with the aid of forceps.

Massage is useful for working large round and irregular foreign bodies downward, but is contraindicated when the body is jagged or pointed.

The administration of coarse food to cover irregular-shaped foreign bodies and oil by mouth or rectum to lubricate the bowel favors transportation of dangerous foreign bodies through the alimentary tract.

Large bottles pointing upward are difficult or impossible to remove unless the anal canal is split, providing additional room, so they can be grasped with the fingers, but when they point downward extraction is readily accomplished with forceps, ensnaring their necks with a string and withdrawing them.

Large irregular or pointed bodies lodged or wedged in the

sacral region are cut down upon posteriorly and removed when they cannot be loosened in any other way.

In rare instances it is advisable to incise rectal and other structures backward or remove the coccyx to enable the operator to extract large angulated or impacted foreign bodies from the rectum. The author found this and splitting the peritoneum necessary while removing a forked stick driven into the rectum by the patient falling upon it.

Sometimes splitting the rectovaginal septum is necessary to facilitate the extraction of certain foreign bodies lodged in the lower bowel.

Clean-cut are *closed*, while extensive *ragged* wounds caused by foreign bodies or operation for their removal are partially sutured and drained.

Postoperative treatment consists chiefly in keeping evacuations soft, trimming off necrotic tissue, and cleansing and draining wounds.

PROGNOSIS

The prognosis depends on the location, composition, size, and shape of the body. Large and pointed bodies in the small intestine or colon are dangerous, since they may cause obstruction, laceration, or perforation and peritonitis.

All sorts of foreign bodies have passed through the bowel without causing symptoms, and when trouble arises hemorrhage, sphincteralgia, localized pain, and abscess are the manifestations most frequently observed.

Occasionally foreign bodies are responsible for death from peritonitis where the bowel has been lacerated by the object or operation while removing it, and fatal results have followed sloughing due to pressure necrosis.

Stricture, fecal incontinence, and fistula or abscess are occasional sequela to foreign bodies in the bowel or operative measures employed in their extraction, but the prognosis is usually good in this class of cases.

Comments on the Author's Cases.—The following comprise a list of foreign bodies removed from the colon and rectum by the author: *fish hook, match, tooth with attached bridge work, button, coins, marbles, apple peel, fruit stones and seeds, singly or en masse, open safety-pin, corncob, pronged stick, $\frac{1}{2}$ by 3 inches (12.7 mm. by 7.62 cm.) in length, bottle, iron hook $\frac{1}{4}$ inch (6.35 mm.) by several inches in length (Fig. 172), jelly glass, cork, nails (Fig. 677), ordinary and horseshoe, tack, pin, needle, toothpick, detached end of proctoscope obdurator, jackstone, fish bones, chicken bone, bismuth concretions*

(Fig. 937), *pig's knuckle*, copper and silver nitrate sticks, enterolith, large vesical (Fig. 679) and biliary calculi.

In the majority of the author's cases foreign bodies were lodged in the lower rectum or anal canal and caused bearing down or lancinating pain, sphincteralgia, constipation, and an irresistible desire to stool. Abscesses occurred in 2 instances: submucous, the result of an embedded seed, and ischiorectal, caused by a chicken bone that penetrated the rectal wall.

Incontinence occurred twice: in one the sphincter was lacerated during the evacuation of a large concretion formed about a coin, and in the other case it was severed by a piece of glass during defecation.

On one occasion splitting the anal canal to gain sufficient room was necessary, and on another laparotomy and sigmoidotomy were required in the removal of a foreign body lodged at the rectosigmoidal juncture.

Hemorrhage, slight or profuse, was encountered several times, but none of the author's cases died from this or other causes.

In conclusion the author will give a brief description of Hosford's case¹ of intestinal foreign bodies, one of the most interesting on record:

"The patient was a male lunatic aged thirty-three, who complained of pain in the abdomen. He had not been sick. The abdomen was slightly distended and tender all over; it moved fairly well on respiration, was tympanitic, and nothing definite could be made out. Nothing was detected per rectum, and having excluded as far as possible all forms of external strangulated hernia, and finding no physical signs in his chest, he was ordered an enema and restricted to fluids. The time occupied in the passage of the following articles was twenty-four hours: 14 pieces of wood, ranging in size between $3\frac{1}{4}$ inches by $\frac{5}{8}$ inch and 1 by $\frac{1}{8}$ inch; 12 pieces of stone, ranging in size between 2 inches by 1 inch and $\frac{1}{4}$ by $\frac{1}{4}$ inch; 20 pieces of cloth, ranging in size between 12 inches by 1 inch and 1 by 1 inch; 10 pieces of cotton neckties, ranging in size between 13 by $1\frac{1}{2}$ inches and $4\frac{1}{2}$ by $1\frac{1}{2}$ inches; 40 pieces of blanket, ranging in size between 13 by $1\frac{1}{2}$ inches and 2 inches by 1 inch; 19 pieces of fustian and corduroy, ranging in size from 12 inches by 1 inch to $2\frac{1}{2}$ inches by $\frac{1}{2}$ inch; 8 linen buttons; 4 brass buttons; 5 match stalks; 1 overcoat button; 1 piece of tape 3 inches long; 5 bootlaces 6 inches long; 2 pieces of linen shirt 6 and 9 inches long, respectively, by $2\frac{1}{2}$ inches wide; the bottom piece of a match box; a sharp piece of the bowl of a clay pipe ($\frac{1}{2}$ inch square), besides sev-

eral large pieces of coal, rolled-up paper, wool, and 7 long pieces of knotted handkerchief, etc.

"Six days after the patient had been declared to be convalescent and was up and about taking ordinary food and apparently in a normal state of health, he was sent to bed with diarrhea. He had no temperature, but the abdomen was slightly distended and tender all over. He died sixteen days later. At the postmortem examination there was marked chronic pelvic peritonitis. The lower portions of the intestines were absolutely matted together. There was marked congestion of the jejunum and ileum, and also of the large intestine; but there was no ulceration and, moreover, no perforation. On opening the intestines the following is a list of some of the articles removed: Twenty pieces of linen, ranging in size from 11 by $3\frac{1}{4}$ inches to 1 inch by $1\frac{1}{2}$ inches; 14 pieces of blanket, ranging in size from $4\frac{1}{2}$ by $2\frac{1}{2}$ inches to 2 inches by 1 inch; 6 pieces of wood, ranging in size from $3\frac{3}{4}$ by $1\frac{1}{2}$ inches to $1\frac{1}{2}$ inches by $\frac{1}{2}$ inch; 6 pieces of neckties, ranging in size from 5 by 4 inches to 3 by $3\frac{1}{4}$ inches; 50 shirt and trouser buttons; 7 match stalks; 3 large pieces of cinder; 1 long boot-lace; 1 overcoat button, and 1 piece of handkerchief 4 inches square, besides a quantity of rolled-up paper. The majority of articles were found in the jejunum and ileum, and several of the pieces of blanket were firmly wound round pieces of wood and covered with fecal accumulation. From the first to the last there was never complete obstruction; there was no vomiting and no hemorrhage."

Chaptcr LXIV

Enteroliths—Intestinal Calculi—Concretions

INTESTINAL calculi and concretions are encountered in all segments of the gut. Statistics of others indicate they are usually located in the small intestine or colon, but in the author's 54 collected cases enteroliths were met with more frequently in the rectum than all other segments of the intestine. To gain information regarding the frequency of intestinal concretions, ascertain their location, composition, and number, determine the relation of sex in this class of cases, and study the comparative age of patients thus afflicted the author compiled the table shown on page 495 which includes his own cases.

Since publication of this series the writer has encountered intestinal calculi or concretions in a number of instances, and has also treated 3 patients where intestinal *sand* was repeatedly detected in the stools.

Sand diarrhea was frequently encountered in soldiers fighting in the sand dunes of Belgium during the World War.

In this list of cases stones or concretions were located in every segment of the bowel except the duodenum and ascending colon, viz.: in the rectum 35, sigmoid 5, descending colon 1, transverse colon 3, cecum 3, ileum 4, and jejunum 3 times. There were 35 females and 19 males, and the number of calculi varied from one to thirty-eight; and of these, 41 had one stone, and 13 of the remaining patients two or more. The age of the patients ranged from six to ninety-two years, of whom 3 were under eight; 6 between fourteen and twenty-five; 4 between twenty-five and forty; 15 between forty and fifty; 8 between fifty and sixty; 9 between sixty and seventy; 7 between seventy and eighty, and 1 between eighty and ninety, the average age being approximately fifty years.

There are several varieties of intestinal calculi and concretions which, for convenience of study, the author has classified as follows:

1. Gall-stones—biliary calculi.
2. Hairy concretions—bezoars.
3. Avenoliths—oat stones.
4. Enteroliths—intestinal calculi.
5. Bismuth concretions.

**SYNOPSIS OF 54 CASES OF ENTEROLITHS AND INTESTINAL CONCRETIONS
COLLECTED BY THE AUTHOR**

Number of case.	Number of stones.	Age.	Sex.	Location.	Composition.	By whom reported.
1	1	25	M.	Jejunum.	Desiccated bile, feces, inorganic salts.	König.
2	12	50	F.	Jejunum.	Magnesium and potassium phosphate, fat, amorphous material.	Bieber.
3	4	52	F.	Ileum.	Inorganic salts, hair, feces, cotton fiber.	Mehr lust.
4	2	67	F.	Jejunum.	Pot. sulphate and phosphate, mg. and ammon. phosphate, feces.	Ellenbogen.
5	1	48	F.	Cecum.	Starch, fat, dyalisin, inorganic matter, feces.	Burns.
6	6	73	F.	Rectum.	Largely mineral phosphates and carbonates.	Holden.
7	1	55	M.	Rectum.	Nucleus of plum-stone, bile-pigment, cholesterol.	Roeder.
8	2	60	F.	Rectum.	Not given.	Welch.
9	1	70	M.	Ileum.	Mineral phosphates and carbonates.	Van Buren.
10	1	72	M.	Ileum.	Cholesterin, bile-pigment, salts.	Specht.
11	1	68	M.	Cecum.	Ammon. mg. phosphate, pot. and sod. carbonate.	Von Hirt.
12	1	78	F.	Rectum.	Albumin, NaCl, K ₂ SO ₄ , CaSO ₄ , bile.	Mayer.
13	19	7	F.	Trs. colon.	Phosphates of Mg., Ca, K, bile, feces.	Rothlein.
14	2	67	F.	Rectum.	Phosphates of Mg., Ca, K, bile, feces.	Schmidt.
15	36	31	M.	Rectum.	Nucleus of cherry-stones, feces, inorganic salts.	Woehr.
16	1	68	M.	Rectum.	Calcium, potassium, and magnesium phosphates and sulphates.	Traube.
17	1	23	F.	Sigmoid.	Earthy salts and bile-pigment.	McDonald.
18	1	75	F.	Sigmoid.	Earthy salts and bile-pigment.	Dieger.
19	1	49	F.	Rectum.	Sod. sulphate, am. and Mg. phosphates, Ca salts.	Le Vale.
20	38	61	F.	Rectum.	Mineral phosphates and carbonates.	Behring.
21	1	43	F.	Rectum.	Unknown.	Chaikovsky.
22	19	64	F.	Rectum.	Inorganic salts, cotton fiber, hair, feces.	Blume.
23	1	8	M.	Jejunum.	Bile-pigment, feces, amorphous material.	Hartse.
24	1	92	F.	Cecum.	Bile-pigment, feces, amorphous material.	Lichtenberg.
25	1	63	F.	Sigmoid.	Oat husks, feces, bile-salts.	McCurdy.
26	1	57	F.	Rectum.	Nucleus of peach stone, bile, feces.	Hart.
27	6	29	F.	Rectum.	Undetermined.	Layers.
28	1	39	M.	Rectum.	Largely salts of Mg. Bi, and K.	Richardson.
29	1	74	M.	Rectum.	Nucleus of calcined bile, periphery of petrified fecal elements.	Manley.
30	1	45	F.	Rectum.	Not stated.	Boshe.
31	1	60	F.	Rectum.	Feces, hair, inorganic salts, bile.	Pollock.
32	3	43	M.	Trs. colon.	Pot., cal., and ammon. phosphates and carbonates.	Grant.
33	1	56	M.	Ileum.	Mineral phosphates, hair, feces.	Allen.
34	1	46	M.	Rectum.	Mineral phosphates, hair, feces.	Allen.
35	1	48	F.	Rectum.	Unknown.	Jaeger.
36	1	49	F.	Rectum.	Bile-pigment, cholesterin, salts.	Hammer.
37	1	81	F.	Rectum.	Starch, fat, cotton fiber, feces.	Garden.
38	1	42	M.	Des. colon.	Albumin, NaCl, Na ₂ SO ₄ , CaSO ₄ , feces.	Haussman.
39	1	14	F.	Sigmoid.	Nucleus of cherry stones, feces, bil.	Graf.
40	1	28	M.	Rectum.	Ammonium and magnesium phosphate, bile.	Hut.
41	1	62	M.	Rectum.	Ammonium and magnesium phosphate, bile.	Hut.
42	1	49	M.	Rectum.	Phosphates, carbonates, H ₂ O, cholesterin.	Martin.
43	1	16	F.	Rectum.	Not given.	McDowell.
44	6	54	F.	Rectum.	Mineral salts, feces, insol. material.	Brucke.
45	1	52	F.	Sigmoid.	Calcium phosphate and carbonate.	Daniels.
46	1	6	M.	Rectum.	Undetermined.	Coleman.
47	1	18	F.	Rectum.	Starch, feces, cholesterin, fat.	Moore.
48	1	74	F.	Rectum.	Plum stones, inorganic salts.	Davis.
49	1	76	F.	Rectum.	Undetermined.	Halle.
50	1	24	F.	Rectum.	Ammonium and magnesium phosphate, calcium salts.	Thalman.
51	1	50	F.	Rectum.	Ammonium and magnesium phosphate, calcium salts.	Fuller.
52	1	46	F.	Rectum.	Cholesterin and mineral phosphates and carbonates.	Gant.
53	3	50	M.	Rectum.	Bile-pigment, cholesterin, salts.	Gant.
54	1	43	F.	Rectum.	Phosphates, lime, magnesium, and ammonium and organic matter.	Gant.

6. Pancreatic calculi.
7. Urinary calculi.
8. Coproliths—fecoliths.
9. Prostatic calculi.
10. Miscellaneous concretions.

Gall-stones.—Biliary calculi are encountered more often than other intestinal concretions, enter the bowel through ducts when small or by ulceration and anastomosis when large or irregular; are composed of bile-pigment, lime, and cholesterol, and may appear singly, in numbers, or *en masse*. The author has discovered diminutive, harmless gall-stones in feces on many occasions, and twice encountered them in the rectum, where they had become encysted,



Fig. 683.—Kidney and gall-stones in same patient. (Radiographed at Broad Street Hospital.)

causing pain and sphincteralgia. Gall-stones in the bowel seldom produce symptoms unless they act as nuclei, around which dried feces and salts collect, when concretions sometimes assume considerable proportions and may cause intestinal obstruction, cramps, constipation, and other symptoms.

Hairy Concretions—Bezoars.—Balls and long masses of hair (Fig. 684) are frequently discovered in the intestines of horses, cows, cats, and other animals that lick themselves, and are occasionally encountered in the stomach and intestines of men and women—sane or crazy—who chew and swallow hair. In such cases collections of hair are round or sausage shape, and may be single or multiple, and located in the stomach, small intestine, colon, or rectum, or more than one segment of gut.

The author has treated several patients for dermoid cysts of the lower bowel and sacrococcygeal region, but has encountered but one hair mass—bezoar—in the rectum; in this case the patient was demented, and spent most of her time chewing and swallowing hair, that collected in a ball (hen's egg size), about which the feces accumulated and formed a large hard mass (orange size) that completely obstructed the rectum. Enemata had no effect on the concretion, which was finally delivered with the fingers, following splitting of the anal canal and sphincter under infiltration anesthesia.

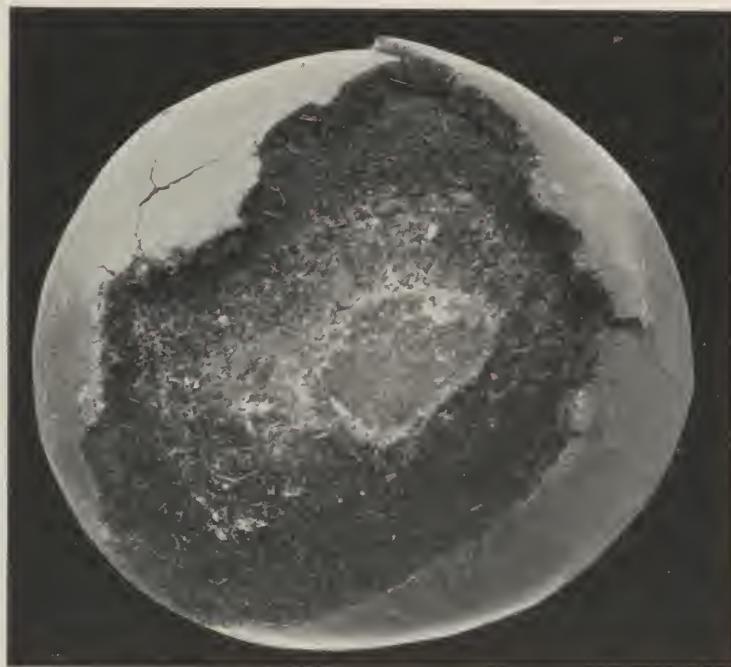


Fig. 684.—Bezoar—hair-ball—responsible for complete obstruction in a horse.

Cases have been reported of hair-balls reaching the rectum through the degeneration of ovarian dermoid cysts.

The author has removed from the rectum of a man who chewed and swallowed *toothpicks* an oval-shaped concretion, fist size, composed of wood fiber and inspissated feces, and cases have been recorded of intestinal obstruction induced by wood-fiber concretions.

Avenoliths—Oat Stones.—A curiosity in the States, is frequently met with in Scotland, where coarse oatmeal is consumed in large quantities.

Avenoliths are oval in form, vary from cherry to orange

size, yellowish unless mixed with salts, when they are whitish in color and of firm consistence.

In this type of concretion vegetable fiber admixed with lime, water, dried feces, and silecia collect slowly, forming in concentric layers.

During the Irish famine, 1846, many intestinal concretions resembling avenoliths were encountered in patients who ate potato skins. In some instances cherry or plum stones acted as a nuclei about which the material collected.

Vegetable matter of any kind having long, coarse fibers, if eaten in large quantities, favors the formation of concretions of the oat stone type.



Fig. 685.—Enterolith removed from rectum. (Actual size.)

Enteroliths.—Intestinal calculi have been encountered in the different intestinal segments, but the author has seldom discovered stony concretions (Fig. 685) in the rectum. Intestinal calculi—pancreatic, biliary, urinary, prostatic—occasionally appear in the excreta, but seldom cause trouble unless the stone acts as a nucleus, about which a fecal tumor forms.

True enteroliths are encountered more often in women than men and are rarely met with in patients under forty years of age. These stones, which may be small and irregular, or large and oval in shape (Fig. 685), vary in weight, from a few grains to 15 ounces (456 gm.) or more when multiple.

Hiemeyer's patient evacuated 32 stones weighing $2\frac{1}{2}$ pounds (1250 gm.), and the author removed from the rectum a urinary

calculus weighing over 4 ounces (120 gm.) (Fig. 686). The composition of enteroliths varies, but usually they are formed principally of the phosphates of lime and magnesia, ammonia, and organic matter, and are commonly met with in patients who have consumed considerable bismuth, chalk, benzoin, or lime as medicine or in drinking-water.

Bismuth concretions, stones, and large or small, black, tenacious, putty-like bismuth masses have often been encountered by the author in patients afflicted with diarrhea, who under orders had taken from 10 to 50 grains (0.6–3.3) of bismuth subnitrate, three or four times daily for months. Such mineral accumulations were found in different segments of the colon, but more frequently in the



Fig. 686.—Vesical calculus (actual size) weighing 4 ounces that ulcerated through the rectovesical septum and caused stricture of the rectum and almost complete obstruction. The author removed the stone with great difficulty through a perineal incision with the aid of strong forceps having serrated teeth.

rectum, they induced partial or complete obstruction, and were dislodged with difficulty, since water, oil, and other enemata do not permeate them.

The author has once performed colotomy in removing bismuth accumulations. In 2 of his cases the rectum was completely filled with bismuth putty, and in another the amount removed was enormous, filling 2 pint Mason fruit jars, and other accumulations were felt in the colon and sigmoid that required days to remove. One jar of the bismuth was preserved, and it formed into irregular shape whitish concretions as water was absorbed (Fig. 937). The author treated a lady who had previously taken bismuth for two years for gastric ulcer, whose rectum contained a concretion (fist size) which was removed, the drug was discontinued,

and yet the patient subsequently expelled two bismuth enteroliths, hen's egg size, one six months and the other two years after the last dose of bismuth had been taken. In this instance the stones caused no discomfort until expelled, when they lacerated the mucosa and caused *fissure in ano*.

Pancreatic Calculi.—These concretions may be single or multiple, smooth and round, faceted or irregular in shape, are small, brittle, and find their way into the intestine through the duct or by ulceration. Pancreatic calculi in the bowel do not disturb the patient unless inspissated feces surround them, and they attain a size sufficient to cause obstruction.

Urinary calculi occasionally escape into the rectum as the result of pressure, necrosis, and ulceration.

The author treated a gentleman for stricture of the lower bowel and rectovesical fistula caused by an enormous urinary calculus weighing more than 4 ounces (120 gm.) (Fig. 686), one end of which projected into the rectum and the other into the bladder, the stone was adherent, and after repeated attempts to extract it through the anus failed, it was finally removed with great difficulty by perineal section.

Urinary calculi ulcerate into the bowel, but seldom cause intestinal obstruction or other distressing manifestation.

Coproliths—fecoliths, fecal calculi—are distinguished from fecal tumors, known as impacted feces, by their smaller size and stony hardness; usually they are oval in shape when single, or faceted and fit perfectly one into the other when multiple. On four occasions the author has removed concretions in the form of scales or balls that were slightly soluble in water, produced a stony sound when dropped on a hard floor, which were composed of the residue of food, combined with earthy or chalky matter.

Prostatic calculi are said to have ulcerated into the rectum, but the author personally has never known or heard of such a case; these concretions are small and would not cause serious annoyance should they escape into the bowel.

Miscellaneous Concretions.—Concretions variable in size, shape, and consistence, composed of fruit peels and stones, berry seeds, and swallowed foreign bodies—pins, fish bones, marbles, coins, etc.—that collected *en masse* or become encased in a coating of dried fecal matter or salts, have frequently been encountered in the colon and rectum; such accumulations are met with in children—particularly boys—more often than adults and in the majority of instances are encountered during the summer months when fruit is abundant.

Several times the author has removed from the rectum or sigmoid enormous quantities of berry or grape seeds, persimmon, cherry, or plum stones, that formed large masses and partially or completely obstructed the bowel; he has also extracted single peach and apricot stones about which feces had collected and formed tumors of considerable size.

SYMPTOMS

The manifestations of intestinal calculi and concretions vary with their number, size, shape, and location. Small stones and concretions do not cause trouble except during evacuations, when they may scratch or irritate the anal canal, large and small enteroliths having a rough surface, or sharp edges, irritate the gut, and incite enterospasm, accompanied by obstipation, retention of gas, and cramps.

Obstruction is the most common and alarming symptom of intestinal stones, generally is not caused by calculi, but by the accumulation around them of inspissated feces; concretions composed of hair, wood fiber, seeds, fruit stones, and oats, or wheat shells frequently attain enormous size, and partially or completely block the colon or rectum. In this form of obstruction the patient suffers from obstipation, severe abdominal pains, nausea, vomiting of the gastro-intestinal contents, tympanites, localized tenderness, muscular rigidity, fast thread-like pulse and temperature, and when rupture occurs the usual manifestations of peritonitis.

Occult hemorrhage and localized distress mark entrance into the bowel of gall-stones or calculi through ulceration.

Rectal occlusion from enteroliths or concretions alone or surrounded by feces is characterized by obstipation or diarrhea alternating with constipation, bearing down pain, straining, incessant desire to stool, and sensations of weight and fulness in the rectum, and when the block is almost or complete, the usual symptoms of obstruction.

Large and small enteroliths or calculi having irregular or sharp edges cause lancinating pains when evacuated; consequently the patient complains of soreness during defecation and agonizing postdefecatory pain, when the wound is irritable and the sphincter contracts.

DIAGNOSIS

Intestinal calculi and concretions are often discovered in feces by apparently well patients. Enteroliths in the lower sigmoid flexure and rectum that cause bleeding, pain, constipation, or

obstruction are readily diagnosed by digital examination or inspection through the proctosigmoidoscope.

Calculi surrounded by dried or soft feces are difficult to differentiate from impacted fecal masses, but the diagnosis is cleared by breaking up the fecal tumor with a gouge used through the sigmoidoscope, and flushing the bowel until the stone is seen, or recognized by the click when it is touched by an instrument.

In rare instances enteroliths of the large or small intestine are detected by palpation, and differentiated from fecal masses, which are indentable upon pressure. Some idea as to the nature of the concretion or stone is gained by ascertaining if the patient has previously suffered from hepatic, pancreatic, gall-bladder, vesical, or prostatic disturbances, has eaten abundantly of oatmeal or swallowed large quantities of seeds or fruit stones, that might have collected *en masse* within the bowel. Intestinal enteroliths and concretions not diagnosed in the above manner can frequently be located and their number, size, and shape be determined by fluoroscoping and making *radiographs* of the intestine.

Chemical analysis and microscopic examination of stools sometimes reveal intestinal sand or salts in feces that points to the presence of a certain type of stone, and concretions evacuated or removed by operation, when closely studied, enables one to judge of the patient's liability to another attack, for if biliary and other stones remain in the gall-bladder they may enter the intestine later.

TREATMENT

Intestinal calculi in the lower sigmoid and rectum are easily removed through the proctosigmoidoscope when small with the aid of the author's long handled forceps (Fig. 682) or the fingers. In 3 instances the author has found it necessary to split the anal canal and sphincter to gain additional room before large or irregular-shaped enteroliths could be removed. On other occasions large concretions composed of seed, fruit stones, or dried feces were broken up with a gouge or bone forceps, when irrigation failed to wash them out through a large proctoscope.

Where calculi are adherent or deeply encysted they are freed by dissection and delivered with fingers or forceps.

Enteroliths and concretions located in the small intestine and colon in exceptional cases are driven downward and evacuated through the action of castor or mineral oil, salts, massage, and high enemata, but such remedies are contraindicated when the stone is caught in an angulation and the gut is irritable, sore, and contracted.

Under such circumstances warm oil by mouth, hot fomentations to the abdomen, and administration of belladonna, gr. $\frac{1}{4}$ (0.016), three or four times daily to allay pain, irritation and muscular spasms, and relieve the patient.

In rare instances where an enterolith or concretion cannot be dislodged, has become encysted, or causes complete obstruction, it is removed by *enterotomy* or *colotomy*, and when it cannot be extracted in this way, *resection* of the gut or *colostomy*, made above the concretion, is indicated.

The author has performed colotomy once for intestinal concretions—bismuth. Recovery was prompt and no serious complications arose during or following the operation, which was quickly performed by incising the colon and closing the wound with through-and-through reinforced by Lembert sutures following extraction of the concretion.

Chapter LXV

Malformations of the Colon and Sigmoid Flexure

General Remarks.—The intestine, like other organs, is occasionally malformed as the result of congenital defects, arrested development after birth, or pathologic changes that take place during fetal life, infancy, or childhood (see Chapter VII, Vol. I for Anorectal Anomalies).

It is difficult to understand the etiology of congenital malformations of the bowel unless one familiarizes himself with the embryology of the gastro-intestinal tract outlined in Chapter I.

Many disturbances of the abdomen, intestine, and rectum encountered early or late in life result from congenital defects. Different segments of the large and small intestine have been the seat of congenital abnormalities, but the colon and more particularly the rectum and anus have been involved very much more frequently than the small gut, excepting the duodenum, which, because of its connection with the stomach, is often affected by developmental errors.

Malformations involving the gut are frequently associated with abnormality of the mesentery or peritoneum, and defects of either may impair the functions of the other. Congenital bowel defects are very often encountered in infants or children suffering from other congenital anomalies, cleft-palate, harelip, dislocation of the hip, absence of the coccyx, spina bifida, club-foot, sacro-coccygeal tumors, cysts and postanal dimples, atresia of the urethra, anus, vagina, or esophagus, spinal or nerve defects causing fecal and urinary incontinence, supernumerary limbs, lungs, spleen, fingers, or hands, and rectal procidentia.

Congenital anomalies of the intestine are encountered more frequently in males than females, and the malformation may be serious and cause death shortly following birth, extensive enough to induce occasional alarming manifestations, or be slight and not produce either minor or serious disturbances until childhood or adult life, when the bowel begins to perform its full functions.

Malformations of other organs are sometimes mistaken for or cause angulation, twisting or displacement of the small intestine, colon, or sigmoid flexure; occasionally the small and large gut derive their blood-supply from a common mesentery.

The frequency with which intestinal abnormalities are accidentally detected by radiographs during operation and at autopsy

indicates that abdominal lesions thought to be acquired not infrequently result from developmental errors.

Slight congenital defects may eventually lead to serious consequences through migration and axial rotation of viscera, the upright posture, and the changes that take place in the mesentery and peritoneum as the child grows and begins consuming a larger amount of food.

Not infrequently the bowel is distorted through adhesions formed prior to birth, the result of enteritis, peritonitis, or anomalies of the vitelline duct or Meckel's diverticulum.

When the gut is stenosed, invaginated, angulated, or twisted it is usually distended above the block with liquor amnii, and some-

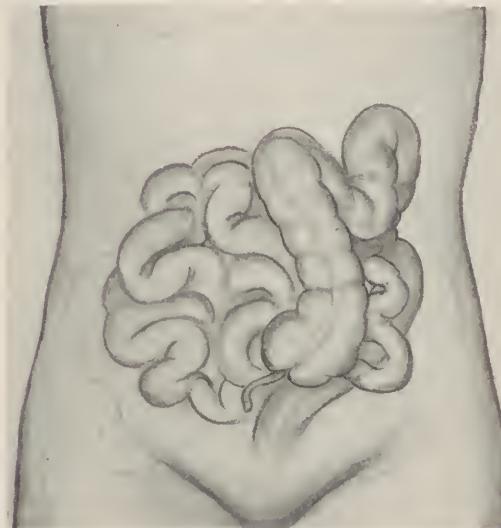


Fig. 687.—Congenital transposition of the cecum, ascending and transverse colon. The cecum is seen resting in the pelvis.

times the musculature is thickened and the mucosa ulcerated to or through the peritoneum.

Types.—Many varieties of intestinal malformations, particularly of the colon and rectum, have been recorded. *Monstrosities* with total absence of the bowel are exceedingly rare; *transposition* of the cecum, colon, or sigmoid flexure (Fig. 687)—usually to the right—is more common than supposed; *stenosis* or *atresia* of the bowel is encountered with comparative frequency; *congenital dilatation* of the colon—Hirschsprung's disease (Figs. 931, 932)—is fairly common, and *diverticulae*, including Meckel's, are a frequent cause of intestinal blocking at birth or later on in life; *intussusception* also is a common lesion.

Other intestinal defects include congenital herniæ, intestinal fistulæ, opening of the gut at the umbilicus, duplication of a gut segment, bifurcation of the colon, termination of the gut in an umbilical tumor or hernial sac, absence of the appendix, attachment of the colon to the abdominal wall or umbilicus by a delicate or thick fibrous stalk (Fig. 689), failure of the cecum or other colonic segments to descend—rotate to the right—and assume their normal location, compression by prenatal adhesions or displaced organs, and continuation of the small into the large intestine without an interrupting ileocecal valve.

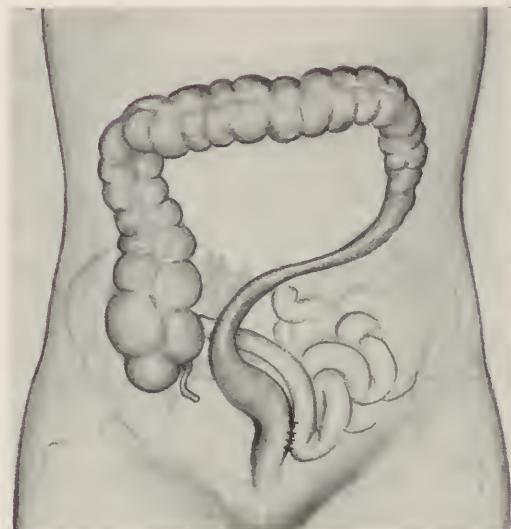


Fig. 688.—Congenital transposition and narrowing of the descending colon and sigmoid flexure. Relieved by ileosigmoidostomy performed by the author.

Stenosis (Fig. 688), **atresia**, represents the most frequent type of colonic malformation, and may partially or completely block the bowel. Congenital strictures may be *annular* or *tubular*, and occlude a short or long intestinal segment. Stenosis or atresia may be produced by a membranous band extending across the interior of the gut, a diaphragm with or without an opening in the center, an indurated tube or rudimentary fibrous cord connecting closed ends of the colon or small intestine, or prenatal adhesions that strangulate or compress the gut from without.

Meckel's diverticulum, encountered in 2 per cent. of humans a short distance proximal to the ileocecal valve, is a prolific source of trouble in women and children owing to the frequency with which it leads to obstruction or formation of intestinal or mesenteric cysts.

That malposition is being recognized more frequently than formerly is indicated by the report of cases, which include 300 of visceral transposition. Quite often the cecum and appendix are absent, fail to descend, and lie under the gall-bladder, or are found on the left side; in a number of instances the sigmoid flexure has been discovered in the cecal region, beneath the liver, and in other abnormal locations, the result of developmental errors, an abnormally long viscus or mobile, short mesentery.

Different segments of the colon have been absent, and all portions of the bowel are at times congenitally displaced or dis-

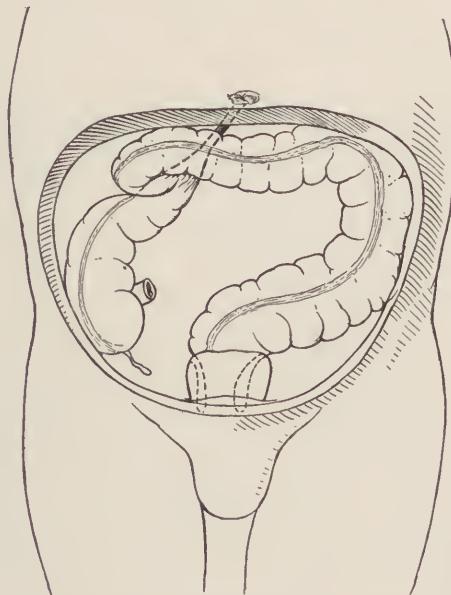


Fig. 689.—Almost complete stenosis—obstruction resulting from acute angulation of the hepatic flexure induced by a thick cartilaginous-like cord connecting the colon and umbilicus operated by the author.

torted. The author operated upon a boy three years of age, referred by Dr. Charles B. Kerley, who had from birth suffered from constipation, colonic dilatation, and fecal impaction, induced by chronic invagination of the sigmoid into the rectum, and sharp angulation of the hepatic flexure, which was firmly attached to the abdominal wall at the umbilicus by a thick fibrous stalk (Fig. 689); the operation, which was successful, consisted in severing the fibrous cord, replacing the hepatic flexure, and correcting the invagination by sigmoidopexy. Several other cases of acute and chronic obstruction encountered in infants, children, and adults

due to different types of colonic congenital malformation have been observed by the author, but space forbids their description.

SYMPTOMS

The manifestations incident to malformations of the colon and sigmoid flexure vary with character of the defect and the degree of consequent obstruction; when the anomaly is serious, meconium is not discharged and evacuations cannot be secured; the abdomen is or soon becomes markedly distended, the pulse rapid and irregular, the skin cyanosed, and the little sufferer cries continuously; vomiting occurs and the temperature rises in the presence of perforation and peritonitis.

Symptoms are modified when the malformation is slight and only partially occludes the small intestine or colon; in such cases while constipation prevails gas, meconium, and feces may be evacuated with cathartics and enemata.

Congenital defects that later in life are responsible for intestinal disturbances produce about the same symptoms as other chronic obstructing bowel lesions.

DIAGNOSIS

Malformations of the colon or sigmoid flexure are suspected when, although the anus and rectum are normal, the infant is restless, frequently cries, has a distended abdomen, a fast, uneven pulse, and repeated medication and injections fail to evacuate meconium or feces. Nausea and vomiting are symptoms when obstruction is acute and complete, but are absent where the stenosis is incomplete and flatus with feces containing an abundance of bile escape.

Congenital anomalies at the anus and in the rectum and lower half of the sigmoid flexure are detected with the finger, bimanual examination, or inspection through the sigmoidoscope. Through the aid of inflation and percussion of the colon the location of the malformation is often defined, but character of the defect cannot be determined except by exploratory incision. Fluoroscopic examination is unsatisfactory and reliable radiographs are difficult or impossible to obtain, because the infant cannot be made to consume a bismuth meal, and the chemical is difficult to inject into the colon because of the blocked and irritable state of the intestine; these diagnostic agents are often useful in less serious defects of older infants and children who have been afflicted since birth with digestive disturbances, gas distention, and fecal impaction alternating with coprostatic diarrhea.

PROGNOSIS

The prognosis of congenital anomalies of the colon and sigmoid flexure is bad in the majority of instances with or without operation; many of the infants die within three days from the obstruction, or shortly following operation as the result of shock, hemorrhage, or inanition; or sloughing and peritonitis may follow in from one to three weeks. Surgical intervention sometimes saves the patient's life, but is not infrequently followed by annoying manifestations and may later lead to acute obstruction from bands, adhesions, cicatricial contraction, etc.

TREATMENT

Palliative measures—laxative cathartics and high enemata—occasionally serve to clear the bowel of meconium, feces, and gas

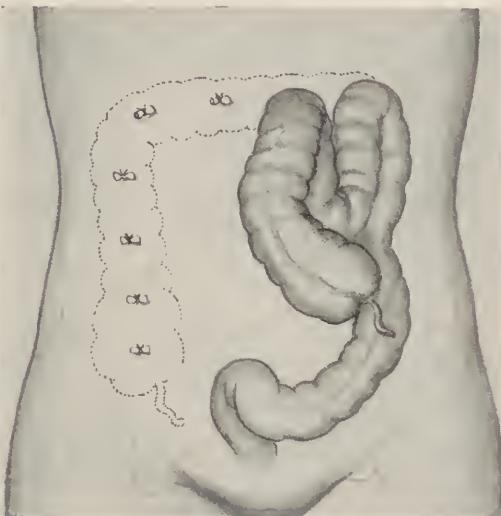


Fig. 690.—Congenital transposition of the right colon causing acute angulation at the splenic flexure. Corrected by severing bandular adhesions and performing colopexy.

when the malformation is located in the colon or sigmoid and does not completely occlude the gut, but these remedies are never curative.

The *surgical* treatment of congenital defects involving the large bowel is unsatisfactory, as a rule, because so many malformations are hopeless from the beginning; others are not diagnosed until the infant or child is moribund from obstruction, and babies frequently die from the shock and hemorrhage of extensive intestinal operations. Nevertheless operative interference in cases of complete obstruction offers the only possible chance for the infant to survive. *Colostomy* is indicated in acute cases to relieve obstruction; subsequently the defect may be corrected by *colectomy* or other operation when the artificial anus is closed.

Chapter LXXI

Myxorrhea Coli—Myxorrhea Membranacea, Myxorrhea Colica—Membranous Enterocolitis and Mucous Colic

Definition.—*Myxorrhea coli* is impossible to define, since it is not a disease, but a *symptom-complex* characterized by periodic mucomembranous discharges, or by colic, abdominal soreness, and spastic constipation.

Since mucus is concerned in the formation of *membranes* and the cause of colic, to eliminate confusion relative to the nomenclature of so-called membranous enterocolitis and mucous colic the author designates these conditions as *myxorrhea membranacea* and *myxorrhea colica*.

General Remarks.—*Myxorrhea coli*, common in all countries and to any age, is encountered most frequently in women and self-indulgent individuals.

Jelly-like mucous masses, strings, strips, or bowel casts (Fig. 691) may be evacuated preceding, during, or following attacks of mucous colic, but generally cramps result from enterospasm when the bowel endeavors to expel *inspissated* mucus.

Membranous differs from other types of colitis, since it is associated with marked *constipation* instead of diarrhea, and occurs chiefly in *nervous* individuals.

Myxorrhea coli may be characteristic from the beginning, but is more often secondary to enterocolonic inflammation, emotional and neurogenic disturbances, ptomain poisoning, and lesions within the abdomen or bowel interfering with secretory nerves, augmenting peristalsis, or inducing bowel blocking associated with stasis and auto-intoxication.

In this condition when mucus is evacuated *quickly* it is thin and jelly-like and does not incite enterospasm and colic, but when *retained* in the colon or sigmoid flexure for days or weeks the patient complains of an indescribable discomfort in the abdomen, periodic cramps, obstinate constipation, and since the watery constituent has been absorbed, mucus is expelled in the form of hard, *yellowish-white lumps, strings, broad strips, or tube-like casts* of the bowel (Fig. 691, A, B, C, D).

ETIOLOGY

Formerly clinicians attributed hypersecretion of mucus to *neurogenic disturbances* or *intestinal catarrh*, but other causes of the condition are now receiving deserved attention, and it is known that nervousness may precede, accompany, or follow myxorrhea membranacea and myxorrhea colica.

The author's ample experience warrants the conclusion that membranous colitis with or without mucous colic may also directly or indirectly be induced by ptomaine or chemical poisoning, continuous purgation, strong medicated irrigations, infection of the small intestine or colon, irritating parasites, enteroliths, foreign bodies, retained inspissated feces, intestinal atrophy, acute infectious diseases, gastrogenic and enterogenic abnormalities, adenoidism, organic changes, faulty metabolism, gourmandizing, and obstructive inflammatory and suppurative diseases of the abdomen or gastro-intestinal tract.

Myxorrhea membranacea and colica may be aggravated or induced by the following conditions, most of which are surgical: congenital anomalies of the bowel, enteroptosis, intestinal angulation, kinks, twists, invagination, adhesions, pericolitis, new growths, diverticulitis, stricture, rectal affections, diseased or displaced neighboring organs, peritonitis, appendicitis, and salpingitis.

PATHOLOGY

The author will not attempt a detailed discussion of the pathology of myxorrhea coli owing to its variegated etiology and because the changes occurring are not understood, since postmortem studies are rare, as the ailment never terminates fatally. The mucosa in some instances appears normal, in others congested or roughened, and the bowel content may or may not contain membranous mucus, depending whether or not examination is made during an attack.

In reality, pathologic changes in the bowel vary and are dependent upon the inflammatory, obstructive, or other disease causing the condition, and in the author's cases of myxorrhea coli attributed to *neurogenic* disturbances the mucous membrane of the sigmoid flexure and rectum usually appeared to be normal when inspected through the proctoscope or sigmoidoscope.

SYMPTOMS

Myxorrhea colica and myxorrhea membranacea may from the patient's viewpoint dominate the disease or lesion causing them, and under such circumstances the sufferer complains of abdominal

crawling or indescribable sensations, or colic preceding periodic evacuation of whitish masses (Fig. 691, *D*), strips (Fig. 691, *B*), strings (Fig. 691, *C*), or casts (Fig. 691, *A*) of the bowel, consisting of mucus from which water has been absorbed. In aggravated attacks characterized by enterospasm colic is severe, constipation obstinate, gas distention observable, digestive disturbances annoying, abdominal soreness present, and, in addition, manifestations of stasis—malaise, nervousness, furred tongue, headache, and cold extremities—are in evidence until mucous collections are evacuated.

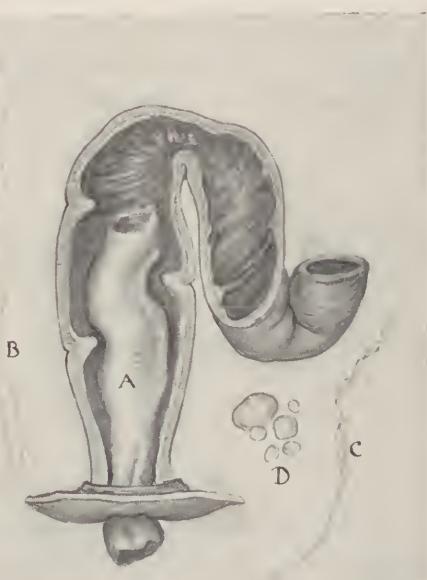


Fig. 691.—Schematic drawing showing variation in appearance of mucus as evacuated in different cases of myxorrhea coli: *A*, Mucous cast of the bowel extruding through the anus; *B*, band-like strip; *C*, narrow twisted strings; *D*, yellow ball-like accumulations of nspissated mucus.

In addition to the above manifestations symptoms of the disease or condition associated with or causing myxorrhea coli may be present.

DIAGNOSIS

When a patient complains of the symptoms mentioned, and gives a history of previous gastro-intestinal disturbances, nerve derangement, menstrual abnormalities, evidences of chronic intestinal obstruction, continuous or periodic constipation with stasis, a diagnosis of myxorrhea coli is justified when mucomembranous evacuations (Fig. 691) follow colic or abdominal uneasiness.

Examination through the sigmoidoscope at such times usually reveals mucous strips projecting through O'Beirne's sphincter—*rectosigmoidal opening*—which, when removed with swab or forceps, gives immediate relief to the patient. Inspection in this way may or may not show the mucosa congested or disfigured by erosions.



Fig. 692.—Microscopic appearance of mucoid discharge in a case of myxorrhea coli showing desquamated epithelia, leukocytes, calcium oxalate crystals, and bacteria.

A general examination of the sufferer will determine the factor or causes of myxorrhea coli.

TREATMENT

Routine treatment may be employed to relieve symptoms during attacks, but is unsuitable in the treatment of myxorrhea coli because of different conditions responsible for it.

Distressing manifestations are relieved before a course of treatment or operation designed to eliminate the cause of myxorrhea coli is attempted. This is satisfactorily accomplished by confining the patient in bed, having him drink hot water, apply abdominal fomentations, and use copious high hot colonic enemata; these soothe the mucosa, relax abdominal and intestinal musculature, and favor the evacuation of retained mucous collections, especially when preceded or accompanied by the administration of castor oil or laxatives in liberal doses to stimulate peristalsis when enterospasm has been overcome.

Intestinal hypersensitivity, muscular spasms, colic, and constipation are relieved by belladonna, mg (0.60), reinforced when

pain is agonizing by codein, gr. $\frac{1}{2}$ (0.32), or morphin, gr. $\frac{1}{4}$ (0.016). Mineral oil administered morning and night by lubrication facilitates the expulsion of retained mucus and feces.

Strychnin, gr. $\frac{1}{60}$ (0.001); Fowler's solution, $\text{v}\nu$ (0.30); extract of physostigmin, gr. $\frac{1}{4}$ (0.016), nerve, muscular, and general tonics are indicated when the sufferer is nervous or run down, and results are better when the above treatment is supported by abdominal massage, vibration, and electricity between acute attacks.

Diet is varied in accordance with the disease or lesion inducing myxorrhea coli, but in non-surgical cases hot fluids, meat juices, and thick soups or pureés leaving little residue are preferable while symptoms are acute; between attacks forced feeding with a diet consisting chiefly of *vegetables—cellulose*—in conjunction with a rest cure is effective in *medical myxorrhea coli*, since it tends to correct constipation due to overdigestion; when periodic attacks have ceased and regular movements attained a coarse diet is discontinued because of accompanying gastro-intestinal discomfort.

Drastic cathartics are irritating and contraindicated during crises of mucous colic, and astringents are harmful in this class of cases. Colonic irrigation, introducing the solution by way of the anus or following *appendicostomy* or *cecostomy* (Figs. 999, 1010), is successful when myxorrhea coli is associated with rectocolonic, inflammatory, or ulcerative lesions.

In deplorable cases where *straightening kinks*, *colopexy*, *breaking up adhesions*, and other *conservative operations* fail to restore bowel function because of extraordinary intestinal distortion, *resection*, *intestinal exclusion*, or *colostomy* are performed to obviate obstruction, facilitate evacuation of retained feces and mucus, and relieve stasis and auto-intoxication.

PROGNOSIS

Permanent relief is more quickly obtained following operations to eliminate obstructive lesions than when medical treatment is employed to overcome myxorrhea coli induced by neurogenic disturbances, intestinal catarrh, or general disease; but in either case when the condition is properly diagnosed and intelligently treated results are satisfactory.

Chapter LXVII

Catarrhal Enterocolitis—Enteritis, Colitis

Definition.—Catarrhal inflammation involving mucosa of the small intestine—*enteritis*—colon—*colitis*—or both—*enterocolitis*.

When the inflammatory process is limited to an individual segment of the small bowel or large intestine it is designated *duodenitis*, *jejunitis*, *ileitis*, *appendicitis*, *typhlitis*, *colitis*, *sigmoiditis*, or *proctitis*.

General Remarks.—Catarrhal enterocolitis and proctitis are frequently encountered in all countries, walks of life, and at different ages, but are prevalent in children and men subjected to exposure. The colon is involved more frequently than the small intestine and the ileum is diseased more often than the duodenum or jejunum.

Catarrhal is accompanied by less distressing manifestations than amebic, bacillary, and balantidic colitis, with which it is sometimes confused.

ETIOPATHOLOGY

The causes of catarrhal colitis and enterocolitis are numerous and varied, and one or several etiologic factors may participate in producing the inflammation.

Colitis and enterocolitis have been attributed to exposure, unhygienic surroundings, sudden changes in the weather and altitude, extreme heat, violent exercise while working in foundries, impure water, unclean food, sitting in a draft, wearing wet clothing, mechanical irritants (gall-stones, intestinal sand, seeds, etc.), chronic intestinal obstruction with fecal and gas retention, local and general infectious diseases (whooping-cough, scarlet fever, diphtheria, and specific inflammation), chronic constipation and fecal impaction, gastro-intestinal disturbances (gastric, enterogenic, hepatogenous, pancreogenic), neuroses, extension of inflammation from other organs, cardiac and hepatic obstruction, ptomain poisoning, drinking freely of ice-water, beverages, and eating ice-cream, swallowing infected sputum, chemical irritants taken as medicines or swallowed with suicidal intent, and irritating foreign bodies (gall-stones, enteroliths, impacted feces, and bismuth accumulations), and intestinal parasites—worms.

Dietary indiscretions, gourmandizing, eating highly seasoned foods, and imperfect mastication are forerunners of intestinal catarrh. Gastro-enterogenic derangements—*subacidity*, *achylia*

gastrica, hyperacidity, atony, motor insufficiency, or malignancy—causing stagnation and incomplete digestion and disturbances or disease of the liver or pancreas interfering with biliary or pancreatic secretion—are occasionally responsible for enterocolitis.

No doubt *obligate* or *accidental* micro-organisms influence or induce *so-called catarrhal* inflammation of the bowel, but the disease thus far has not yet been ascribed to any one particular germ, but *Proteus vulgaris*, *colon bacillus*, *Bacillus enterides sporogenes*, *streptococci*, *B. butyricus*, and others of the accidental and obligate pathogenic micro-organisms of the intestinal canal have been most frequently associated with this condition and participate in mixed infection when the mucosa is eroded or ulcerated.

PATHOLOGY

Changes observed vary with cause of the catarrh, its duration, and association with other affections.

While catarrhal colitis and enterocolitis may be *acute* or *chronic*, appearance of the mucosa is about the same in both, except when the latter is complicated by *mixed infection* characterized by erosions and ulcers. Mucous membrane is hyperemic, swollen, and edematous over circumscribed areas or lengthy segments of gut, and according to the degree of inflammation varies in color from a pink to a dark purple, but may be grayish in appearance.

The disease attacks villi, follicles, and Peyer's patches, and at such points there is edema, erosions, or diminutive ulcers and increased activity of mucus-secreting glands. In the beginning mucosa may be dry and hot, but later, when continuity of epithelium is broken, is smeared with the discharge containing mucus, pus and blood, bile-pigment, and epithelial cells; the odor and ingredients of the discharge change with character of the lesions and pus, blood and mucus increase with multiplication and extension of superficial erosions and deeper ulcers; in neglected cases, with mixed infection, mucosa becomes undermined and ulcers may be connected by fistulæ, complications more frequently encountered in amebic and bacillary colitis.

Occasionally when the mucous membrane is soft and spongy it is dotted with diminutive petechial-like spots or erosions that bleed freely when irritated. Mucus is evacuated *clear* or *jelly-like* when fresh, or *en masse* in strips or casts of the bowel when retained and water has been absorbed. Sometimes mucosa has an uneven granulated appearance, and in rare instances undergoes necrosis and sloughs away. (See Fig. 693, *A, B, C, D.*)

When solitary follicles and agminated glands are extensively involved in persons having a lowered resistance it has been designated *follicular enteritis* or colitis (Fig. 693, *D*), and in such cases bacterial activity is marked. In cases of neglected chronic colitis manifestations are distressing and changes in the mucosa are more marked.

In the *hypertrophic* form glands are long, irregular, pouched, and tend to cyst formation, connective-tissue hyperplasia with

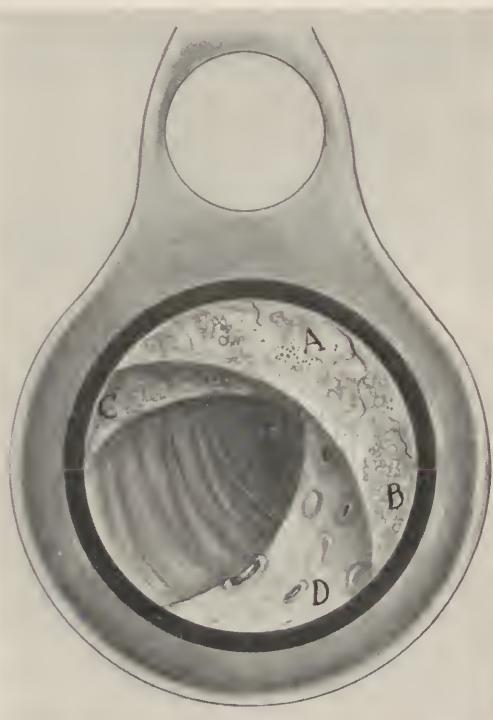


Fig. 693.—Composite proctoscopic view of punctate lesions: *A*, Pin-point ulcers; *B*, granular areas; *C*, erosions, and *D*, follicular ulcers as they appear in different types and grades of chronic catarrhal and other forms of ulcerative proctocolitis.

stenotic tendency is characteristic, and hypertrophic changes leading to the formation of *polyposis* is common.

In *atrophic* colitis intestinal tunics are thinned, villi shrink or disappear, and mucosa has a dry, pale, glazed appearance.

Once epithelium is destroyed lesions may be few or numerous, superficial or deep, but in uncomplicated cases of catarrhal enterocolitis, ileitis, and colitis hemorrhage, submucous ulcers, abscess and fistulæ, infected glands, perforation, and stricture are *rare*,

and the patient is not so exhausted as in cases of infectious colitis because manifestations are less debilitating and distressing.

SYMPTOMS

The manifestations of non-specific or catarrhal colitis are fairly characteristic, but vary in different stages of the disease when complicated by another affection and when the disease is limited to a single segment or involves the entire colon.

Acute catarrhal enterocolitis, or colitis, at the onset is characterized by anorexia, malaise, abdominal soreness, pain and gurgling, cramps, nausea, diarrhea, temperature, and frequent explosive evacuations.

In *colitis* alone distress is less and stools are fewer and more normal in appearance, but contain considerable mucus, and in some instances constipation and diarrhea alternate. In *chronic colitis* and *enterocolitis* the above manifestations are present in a modified form, but diarrhea is dominating and stools are few or many and fluid or semisolid, depending on the irritant responsible for continuance of the inflammation, character of lesions in the mucosa, nature of food consumed, activity of the patient, and influence of associated disease.

Indigestion, pain, cramps, and diarrhea are proportionate to the lesions, and the amount of pus, blood, and mucus in the stools increases or decreases as the inflammatory process extends or diminishes.

When the sigmoid flexure or rectum are highly inflamed or ulcerated in addition to the above symptoms the patient complains of a frequent desire to stool, dull or aching pains in the lower bowel, and bright blood in evacuations.

Appendicitis, reflex phenomena, dyspepsia, indicanuria, intestinal lithiasis, and pneumonia occasionally complicate colitis and enterocolitis.

DIAGNOSIS

Catarrhal colitis is differentiated from amebic, tubercular, bacillary—Shiga—balantidic, and syphilitic colitis by the mildness of diarrhea, small amount of pus and blood in stools, slight degree of pain and colic, tenderness on pressure, rareness of borborygmus, absence of offensive stools, unimportant loss of weight, lack of sallow complexion, anemia and other evidences of toxemia or sepsis resulting from mixed infection, and microscopic examination of stools which fails to reveal bacilli, amebæ, *Balantidium coli*, etc., responsible for specific forms of ileocolitis and coloproctitis.

Occasionally catarrhal inflammation is due to irritation caused by *helminths*, in which case ova or worm segments are detected, but it is well to bear in mind that the patient may suffer from simple colitis and infection, the result of lumbricoid tapeworms and other parasites. Chief reliance, however, is based on ascertaining if the patient has previously suffered from neurogenic or gastrogenic disturbances, ptomain or chemical poisoning, or influenza, noting subjective and objective symptoms, and inspecting the rectum and sigmoid through a tubular instrument. *Urinary* examination usually shows *indicanuria* and blood changes, particularly increased *eosinophilia*, which indicate the inflammatory process is caused by parasitic infection.

Since treatment is practically the same, as a rule it is unnecessary to attempt to differentiate between catarrhal inflammation of



Fig. 694.—Einhorn's long-jointed intestinal tube, useful for diagnostic purposes and occasionally for administering intestinal lavage and colonic irrigations when introduced through the mouth.

a particular segment of the bowel. Occasionally it is advisable to make a *Wassermann*, ascertain if the patient has *enteritis* or *colitis syphilitica*, employ *tuberculin* tests, and examine the lungs and other organs for foci to determine whether or not the patient is suffering from tubercular colitis.

Appendicitis is characterized when *acute* by right iliac tenderness, pain and rigidity of the abdominal muscles, and when *chronic* by localized tenderness upon pressure at McBurney's point.

Pancreatic diarrhea is distinguished by finding an abundance of fat in the dejecta. An analysis of the gastric juice and *succus entericus* is made, for in this way only can one determine if intestinal catarrh is caused or aggravated by unbalanced digestive juices, and macroscopic inspection of feces is essential, for when undigested food remnants are repeatedly detected it points to imperfect action of the gastric or intestinal juice, or both.

TREATMENT

From what has been said concerning the etiology, pathology, and symptoms of catarrhal enterocolitis, it is obvious that a *routine treatment* is impracticable in this class of cases.

Acute enterocolitis or *colitis* may quickly subside spontaneously, but when it does not, manifestations can be modified or made to disappear by having the patient abandon work, remain in bed, and confine his diet to soup, koumiss, zoölak, sour milk, strained gruels, scraped meats, and soft-boiled eggs, and as he becomes more comfortable permitting him to partake slightly of pigeon, chicken, and rare beef, rice, bread and butter, and baked potatoes. Raw fruits, cold drinks, sweets, cucumbers, cabbage, and ice-cream are interdicted until cramps and diarrhea disappear and evacuations are normal.

Medical treatment is symptomatic and is best inaugurated by calomel, gr. iij to x (0.2-0.6), because of its cathartic and antiseptic action, or castor oil, ʒj (30.0), which effectively clears the irritable bowel of undigested food residue, mucous, toxic, and other irritants.

Cramps and soreness not controlled by heat are speedily relieved by the tincture of belladonna, ℥x (0.60), or atropin, gr. $\frac{1}{100}$ (0.0006), three times daily, which lessens enterospasm and muscular rigidity. When these agents fail suffering is overcome by reinforcing them with hot saline colonic enemata and administering tincture of opium, ℥x (0.60); codein, gr. $\frac{1}{2}$ (0.03), or morphin hypodermically, gr. $\frac{1}{4}$ (0.016), as required. Warm slippery elm, oatmeal-water, or flaxseed tea injections exhibit a marked tendency to soothe and heal the inflamed mucosa.

Treatment of Chronic Enterocolitis and Colitis.—During exacerbations the treatment of *chronic* is the same as recommended for *acute* colitis, but at other times when symptoms—diarrhea, pain, and tenesmus—are modified the patient is permitted to attend to his social and business duties, indulge in mild open air exercise or games, seek amusement, partake of a mixed diet, providing he consumes his food more often and in smaller amounts and excludes acids, uneooked foods, cold water, ices, milk, and articles of diet that disagree with him.

The author has discontinued the starvation treatment in this class of cases and his patients rapidly gain in weight and suffer less when allowed a liberal mixed diet at regular hours, provided the colon is daily flushed with a normal saline, Carlsbad salt, boric acid, ichthyol, 2 per cent., or other irrigant.

Massage, vibratory, and electric treatments made to the spine, over the abdomen or intrarectally, with the idea of strengthening

the atrophied or atonic bowel, have been discarded by the author because they have increased intestinal irritability or aggravated diarrhea.

Hydrotherapy in the form of *Scotch douches, baths, or hot packs*, warm or cold *colonoclysis*, and intelligent *water drinking* is advantageous in some cases, because water employed in the above manner acts as a tonic, allays irritability, and clears the bowel of its irritating content.

Mineral waters as prescribed at certain *so-called cures* are beneficial, but are not reliable unless reinforced by other therapeutic measures.

Medicines and drugs employed in conjunction with other curative measures relieve symptoms and sometimes cure chronic catarrhal colitis. When constipation is troublesome or alternates with loose movements the bowel is cleared when necessary with the aid of water drinking, fruit laxatives, Epsom salts, castor oil, $\frac{3}{j}$ (30.0); calomel and soda, gr. iij (0.2), or warm oil enemata, $\frac{3}{viij}$ (250.0), containing $\frac{3}{ij}$ (8.0) of inspissated ox-gall.

Antiseptic, soothing, and astringent remedies are indicated when it is desirable to reduce intestinal secretion, irritability, fermentation, putrefaction, and peristaltic activity, since they allay abdominal discomfort, lessen diarrhea, tend to solidify feces, and soothe the sensitive mucosa when prescribed in the following form and dosage three or more times daily.

Bismuth preparations, gr. x to xx (0.6–1.3); beta-naphthol, gr. v (0.30); salol, gr. v to x (0.30–0.60); tannigen, tannalbin, or tannopin, gr. v to xv (0.3–1.0); ichthalbin, gr. x to xx (0.6–1.3); calcium carbonate or phosphate, chalk or charcoal, gr. xv (1.0), alone or in conjunction with olive oil, nutralol or petroleum, $\frac{3}{j}$ (30.0), give the best results.

Pain, cramps, diarrhea, and tenesmus not relieved by rest, heat, dieting, and above-mentioned drugs, are usually controlled by opiates—morphin, gr. $\frac{1}{4}$ (0.015); opium extract, gr. $\frac{1}{2}$ (0.03), or codein, gr. $\frac{1}{4}$ (0.015)—administered as indicated, but when cramps—enterospasm—are not relieved in this way, belladonna, gr. $\frac{1}{4}$ (0.015), combined with the opiate and administered by mouth or per rectum in a suppository quickly brings relief.

Irrigating Treatment.—*Mild* are more effective than *strong* irrigants in the treatment of catarrhal colitis during the *pre-ulcerative* stage, and satisfactory results are obtained when the colon is thoroughly irrigated once or twice daily with a normal saline, boric acid 3, ichthyol, balsam of Peru or argyrol 1 to 5 per cent. solution, and treatments are alternated with high colonic

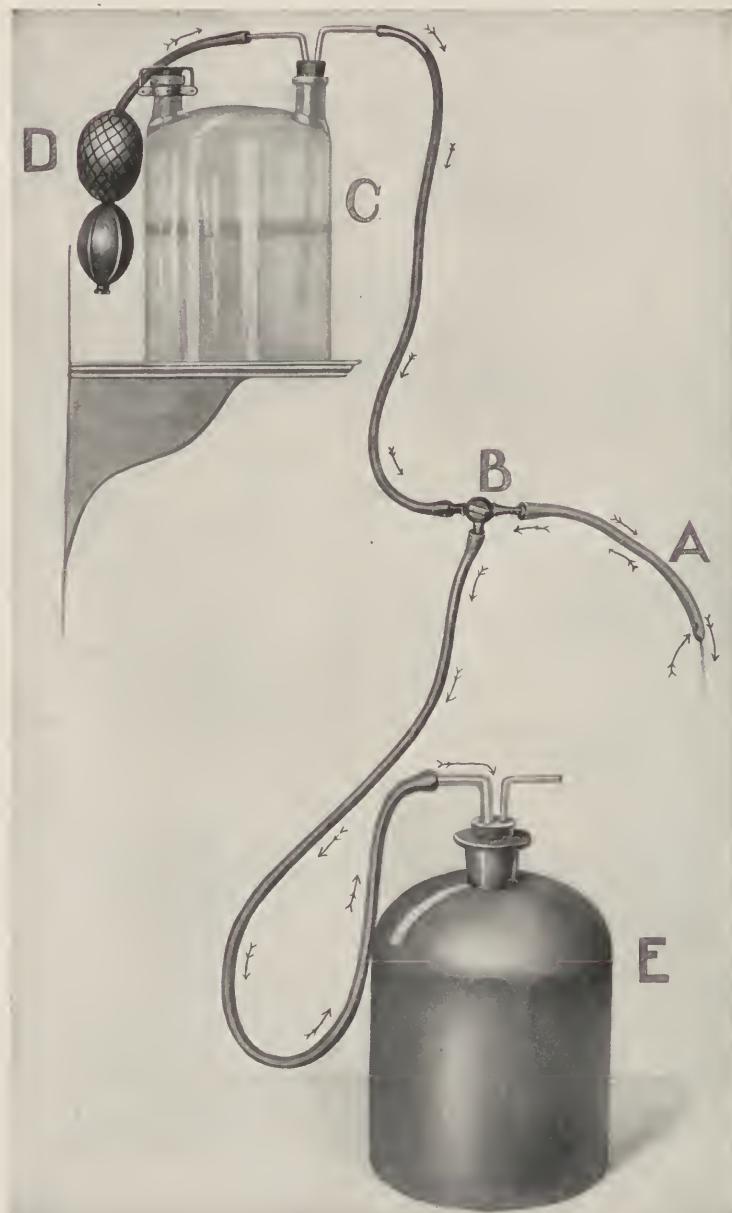


Fig. 695.—Irrigating apparatus employed in author's office and sanitarium in the treatment of catarrhal enterocolitis.

olive or cotton-seed oil, Oj (500.0), enemata containing bismuth, aristol, or salol, 3ij (8.0), which soothe and protect the inflamed

mucosa and augment healing. The author employs the apparatus shown in the accompanying illustration (Fig. 695) or his irrigator shown elsewhere.

When the colon is extensively ulcerated, the result of mixed infection, and diarrhea and hemorrhage are troublesome, stronger irrigants are required, of which silver nitrate, gr. v to Oij (0.30–1000 c.c.), in warm water, and ichthyol (5 per cent.) irrigations are satisfactory.

Vaccines, helpful in typhoid and bacillary colitis, are unreliable in catarrhal enterocolitis.

Long colon tubes are unnecessary and ineffective (Fig. 696) for irrigating purposes.



Fig. 696.—Showing manner in which long colon tubes curl up in the sigmoid even when introduced through a proctosigmoidoscope, which renders them useless for administering high diagnostic enemata and irrigations.

Inflation of the intestine with *oxygen* stimulates the patient, diminishes anemia, and tends to relieve catarrhal inflammation of the bowel.

Opotherapy and Organotherapy.—Intestinal extracts and secretions are occasionally useful when they do not irritate the mucosa.

Topical applications of silver nitrate, ichthyol, and balsam of Peru, 10 to 20 per cent., made to the irritable mucosa and erosions are helpful.

Surgical Treatment.—Surgical intervention is less often indicated in *catarrhal* than in *tubercular, amebic, bacillary*, and other *infectious* types of colitis, and in this class of cases *resection, intestinal exclusion, enterostomy, and colostomy* are rarely required.

Appendicostomy (Fig. 1019) and *cecostomy* (Fig. 999; see Chap-

ter XCIII), which enable one to freely irrigate the large intestine from cecum to anus, have given universal satisfaction in the author's hands in chronic aggravated cases of colitis complicated by loose movements, ulceration, and blood or mucus in the stools, that resist hygienic, dietetic, and medicinal treatment reinforced by colonoclysis introduced *per anum*. Irrigants employed in connection with these procedures are the same as recommended elsewhere.



Fig. 697.—Method of making topical applications to inflamed areas through a pneumatic proctoscope and sigmoidoscope in catarrhal and other varieties of coloproctitis.

Gant's ileocecostomy (Fig. 991), which permits of separate or simultaneous irrigation of the ileum and colon, is indicated in troublesome cases of catarrhal enterocolitis.

Prognosis.—*Adults* suffer considerable annoyance and discomfort from *acute catarrhal enteritis*, *colitis*, or *enterocolitis*, but recover in a short time except in cases complicated by extensive ulceration and aggravated diarrhea, but *infants*, young children, the aged, and enfeebled individuals are often greatly exhausted, and may succumb to acute or chronic catarrhal colitis unless carefully handled.

Chapter LXVIII

Amebic Colitis—Amebiasis, Amebic Dysentery

Definition.—Amebiasis is a chronic infection caused by *Entamæba histolytica*, characterized *anatomically* by serious inflammatory and ulcerative lesions in the rectocolonic mucosa, and *clinically* by frequent fluid movements containing blood and mucus, abdominal pain, rectal tenesmus, anemia, and prostration.

General Remarks.—Amebic colitis or so-called tropical dysentery, formerly classified as a *constitutional*, is now known to be a *local* disease, but one capable of producing systemic disturbances.

The disease is encountered among all *classes*, but is most common and fatal among poorly nourished individuals doing arduous labor and persons living in unhealthy localities.

Amebiasis may be met with at any *age* and in both *sexes*, but is particularly common between the twentieth and thirty-fifth years, and men are more often afflicted with it than women (5 to 1), because they are more frequently exposed and work in communities where the disease is prevalent.

Amebic dysentery was formerly considered a disease of tropical and semitropical countries, but it has followed trade *routes* and is now encountered throughout the world in epidemic, endemic, or sporadic forms. Amebiasis has rapidly increased in the United States since the Spanish War, and is now encountered everywhere, but is more common below than north of the Mason-Dixon line.

The author has treated a great many individuals who contracted the disease in Cuba, Porto Rico, the Philippines, China, Japan, Africa, or India, and has observed amebic colitis in 30 patients coming from seventeen different states and Canada, who had never been out of North America. Evidently the disease increases proportionately in our dealings with countries in which amebiasis is common.

Etiology.—While age, sex, heat, exposure, arduous labor, over-work, swampy communities, poor food, and famine are predisposing factors, they independently do not induce amebiasis, since the disease is *specific* and caused by *Entamæba histolytica* (Fig. 698), which is often associated with the harmless *Entamæba coli*.

Usually amebic colitis is contracted through drinking contaminated water, eating vegetables from gardens fertilized with



Fig. 698.—*Amoeba histolytica*: 1, Vegetative form, showing cyclic changes in nucleus. Above, to the left, is a hyaline pseudopod. The original outline of the ameba shows at a slightly higher level. 2, Vegetative form, showing coli type of nucleus. 3, Vegetative form, showing spindle-shaped caryosome. 4, Beginning encystment. 5, Individual with large vacuoles in cytoplasm and indistinctly staining nucleus. Probably degenerating form. 6, Degenerating form. The nucleus has lost its structure; the chromatin is collected in masses inside the nuclear membrane. Chromidia in the cytoplasm. 7, Beginning encystment. There is a large vacuole in the cytoplasm. The nucleus is poor in chromatin; there is no caryosome, and there is a thin layer of fine granules of chromatin around periphery of the nucleus. There is no evidence of nuclear membrane. 8, Beginning encystment. Large vacuole and numerous chromidia in the cytoplasm. 9, Like 7, but there is no vacuole, and there is a large chromidium in the cytoplasm. 10, 11, Complete cysts with four nuclei. (Whitmore.)

human feces or that receiving drainage from toilets or privies; consuming food carelessly, handling or using a colon tube or syringe previously employed by a person suffering from dysentery.

Entamœba histolytica (Fig. 699) and *Shiga bacilli* are occasionally encountered in the same patient, and streptococci, colon bacilli, flagellates—trichomonas and lamblia—*Balantidium coli*, helminths, and other organisms have been frequently encountered in the stools of patients suffering from amebiasis, under which circumstances inflammatory and ulcerative lesions of the mucosa are aggravated by mixed infection.



Fig. 699.—Amœba histolytica cysts: *A*, Complete four-nucleated cyst with chromidia. *B*, Six-nucleated cyst. Two large nuclei that have not yet divided, an abnormality similar to Amœba coli cysts with more than eight nuclei. (Whitmore.)

Colitis may quickly follow entrance of pathogenic entamebæ into the bowel or develop later when *protozoa* are *encysted* and subsequently become active through intestinal irritation or disease.

PATHOLOGY

Entamebic colitis may be *acute* or *chronic* and changes in the mucosa and deeper structures depend mainly on the duration of the disease, virulence of the infection, location of lesions, and neglect of prompt and intelligent handling of the patient.

Pathogenic entamebæ may invade the mucosa independently or through traumatic lesions—epithelial abrasions—and pass on to the submucosa together with accidental and obligate intestinal bacteria that aggravate the inflammatory process inaugurated by amebæ.

Amebiasis is primarily a disease of the colon, but occasionally organisms pass through the ileocecal valve and cause amebic ileitis.

The cecum, sigmoid flexure, and rectum are usually more extensively involved than other segments of the large intestine, and the disease originating in the cecum extends downward except in those rare instances where the rectum is primarily infected.

Lesions are more numerous, larger, and deeper in the lower sigmoid and rectum owing to retention here of hardened feces, activity of pathogenic bacteria, and trauma incident to defecation and typical ulcers frequently observed upon the upper surfaces of the rectal valves are rarely encountered within the anal canal.



Fig. 700.—Living *Amoeba histolytica* shown in successive ameboid stages (Hartmann).

Acute Amebic Colitis.—Acute amebiasis may be *mild* and induce catarrhal colitis accompanied by diarrhea with a trace of blood and an abundance of mucus in the stools, or be *severe* and induce grave changes in the mucosa responsible for the *symptom-complex* of amebic dysentery.



Fig. 701.—Section of intestine showing *Amoeba histolytica* within the membrane; $\times 750$ (Craig).

In moderately severe cases of acute amebic infection the rectocolonic mucosa is congested, edematous, streaked with blood and glairy mucus, sensitive, and thrown into ridge-like folds and petechial spots, and superficial ovoid ulcers may be observed.

Superficial necrotic areas are occasionally seen, but numerous large ulcers and suppuration in the submucosa is rare in the acute stage. When the disease is particularly virulent dangerous toxins are produced, and an exudate appears which becomes incorporated

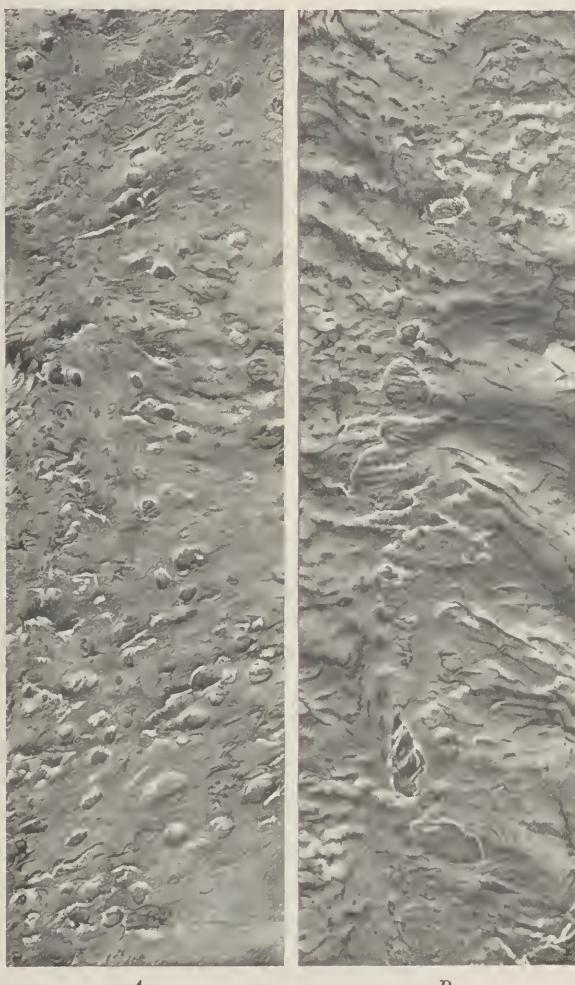


Fig. 702.—Amebic colitis—dysentery: *A*, Follicular ulceration and patches of pseudomembrane. *B*, Large follicular mixed infection ulcers. (Army and Navy Museum.)

with disintegrating mucosa to form the so-called diphtheric membrane (Fig. 702, *A*), which, when it sloughs, causes gross lesions in the colon (Fig. 706, *A*, *B*).

Chronic Amebic Colitis.—In contradistinction to *bacillary*, the

lesions of *entamebic colitis* are deep and the destructive process begins in the submucosa and works its way toward the surface of the mucosa.

In the *preulcerative* stage, through activity of entamebæ and associated bacteria, hemorrhagic yellowish or bright red diminutive elevated areas form in the congested edematous mucosa. Soon, as a result of irritation, interference with the circulation, or trauma caused by feces, papules which contain a viscid fluid undergo necrosis and round or irregular-shaped lesions smeared with a gelatinous secretion form.

During the ulcerative stage the disease progresses rapidly and the patient complains of typical dysenteric symptoms. Entamebæ and pathogenic bacteria located in the submucosa, working in either direction, soon produce *numerous large and small super-*



Fig. 703.—Chronic amebic colitis. Irregular amebic burrowing ulcers of colon. Note how mucosa is undermined.

ficial and deep lesions in the mucosa and *extensive ulcers* beneath the mucous membrane that may be connected with each other by *fistulous sinuses* (Fig. 703). Lesions small in the beginning, located upon the summit of folds in the mucosa, increase in size and depth. These ulcers have a punched-out appearance, grayish or yellowish tint, and are usually *stellate*, *linear*, or *round* in shape (Fig. 704, A, B), and may have sharply defined, uneven, or smooth rounded borders, and may remain separated or coalesce to form extensive ulcers with necrotic edges that penetrate to the submucosa or muscular tunic.

In fully developed entamebic colitis *collar-button* and *extensive undermining ulcers* (Fig. 703) are in evidence. Typical lesions in the mucosa viewed through the sigmoidoscope vary in appearance, depending on their duration and virulence of infection, and the

rims of fresh are undermined, while those of older or partially healed ulcers are round and smooth (Fig. 704, A).



A



B

Fig. 704.—Amebic ulcers of colon: A, Round and ovoid; B, follicular.

In poorly nourished or debilitated individuals and neglected cases the *destructive stage* begins early and mucosa and submucosa become riddled with *ulcers*, *fistulae*, and *abscesses*, and the sufferer



Fig. 705.—Amebiasis with stellate (left) and perforating ulcers (right).

rapidly becomes exhausted because of accompanying toxemia, diarrhea, loss of blood, and inability to obtain rest night or day.

Occasionally a *diphtheric* membrane forms, the mucosa assumes a corrugated or buffalo-skin-like appearance, or becomes

gangrenous, and sloughs over large areas (Fig. 708), exposing the intestinal musculature.

In a few of the author's cases of virulent chronic entamebic colitis numerous *polyps* (Fig. 707), variable in size, having long or short pedieles, were observed.

Untreated entamebie ulcers show little or no tendency to heal, but amebiasis responds promptly to topical applications and colonic irrigation. When the disease has been cured after reaching the

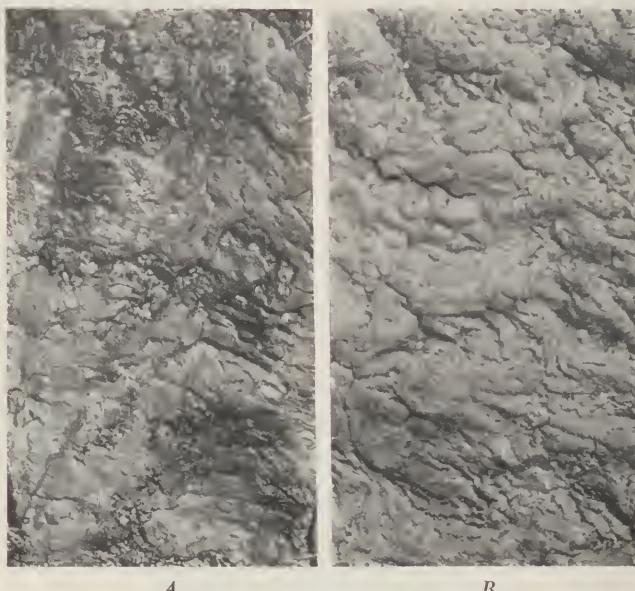


Fig. 706.—Amebic colitis—dysentery: *A*, Ulcerative stage. *B*, Appearance of pseudomembranous diphtheric colitis before sloughing begins.

destructive stage the mueosa has an uneven, scarred appearance (Fig. 709), and occasionally single or multiple strictures are observed.

SYMPTOMS

Manifestations of acute amebiasis may be *mild* or *aggravated*, but in either case are liable to be mistaken for ptomaine poisoning, bacillary colitis, intestinal tuberculosis, or rectocolonic ulceration, afflictions accompanied by like symptoms—abdominal pains or cramps, frequent fluid stools composed largely of blood and mucus, rectal tenesmus, and exhaustion.

The disease may prove troublesome from the beginning or remain latent for a time and suddenly become acute and ushered in by chilly sensations, high temperature, dysenteric manifestations,

toxemia, and evacuation of diphtheric membranes or mucosa that has become gangrenous and sloughed off.



Fig. 707.—Pseudopolyps complicating amebic colitis—dysentery. (Army and Navy Museum.)



Fig. 708.—Amebic colitis of descending colon complicated by gangrenous diphtheric sloughing of ulcerated mucosa. (Army and Navy Museum.)

Acute amebiasis is seldom cured and the infection becomes chronic, irrespective of whether it is mild or virulent.

While manifestations of *chronic amebic colitis* (Fig. 703) vary in accordance with virulence of the infection, duration of the



Fig. 709.—Distortion of mucosa incident to cicatrices caused by chronic amebic colitis. Note healed and unhealed ulcers. (Army and Navy Museum.)

disease and treatment, they are aggravated by dietary indiscretions, violent exercise, exposure, worry, and cold drinks.

The average patient complains of anorexia, feeling of lassitude, loss of weight, frequent fluid or semisolid evacuations containing

blood, and an abundance of mucus and serum, abdominal soreness, cramps, tympanites, and rectal tenesmus. Sufferers of this class are anemic, have a sallow complexion, careworn appearance, furred tongue, and are weak, nervous, and discouraged.

Usually the patient has from three to ten daily movements, which increase or decrease as ulcerated areas enlarge or diminish, and the amount of blood and discharge voided is commensurate with these changes.

Occasionally in latent cases diarrhea ceases or alternates with constipation; in neglected cases the patient goes from bad to worse until he dies from hemorrhage, exhaustion, or complicating disease.

Complications.—*Appendicitis* is occasionally encountered, *perforation* with *peritonitis* is rare, anorectal *abscesses* and *fistulae* are not infrequent, and *hemorrhage*, slight, moderate, or profuse, is quite common when blood is evacuated, *bright red* when from rectal, and *dark brown* in color when due to colonic lesions. *Adhesions* and *angulations* are usual in chronic amebiasis, *stricture* of the colon or rectum is an occasional complication, and *nausea*, *vomiting*, *imperfect digestion*, and other *gastro-intestinal* disturbances are observed in different stages of the disease, the *urine* diminishes during acute attacks and has an acid reaction at all times, *blood changes* (increased eosinophilia) occur owing to parasites and anemia, the color index being low and hemoglobin is diminished about 35 per cent.

The chief anorectal complications of amebic coloproctitis are *erosions*, *fissures*, *procidentia*, *stricture*, *hemorrhoids*, *superficial* and *deep abscess*, *ulcers*, *fistulae*, *polyps*, *relaxed sphincter*, *cryptitis*, and *excoriation* of the *perianal skin*.

Metastatic abscesses in the liver and other organs are an occasional complication. *Hepatic or tropical abscess* is the most common and serious involvement of entamebic colitis, may be single or multiple and be located in different lobes of the liver; these abscesses may remain isolated or rupture into each other, forming enormous pus cavities in which are found pathogenic entamebæ.

DIAGNOSIS

By ascertaining if the patient has been living in a country or community where amebiasis is prevalent, closely studying related symptoms and inspecting lesions through the sigmoidoscope (Fig. 710), one gains a fair idea as to whether or not the patient suffers from entamebic colitis. However, one is not justified in making a positive diagnosis until fresh stools have been examined and *motile Entamæbæ histolytica* (Fig. 698) have been discovered.

Macroscopic examination of feces enables one to ascertain if they contain blood, mucus, pus, serum, membranous or gangrenous tissue, or segments of worms, but is not of great assistance in helping to differentiate between this and other types of colitis, the evacuations of which macroscopically resemble each other.

Microscopic examination is almost infallible when properly prepared, fresh, warm feces are carefully inspected through the microscope a sufficient number of times, because in this way *Entamoebae histolytica*, causative organisms in amebiasis, are discovered and positively differentiated from *harmless Entamoebae coli, helminths, tubercle bacilli, Balantidium coli, dysenteric bacilli—Shiga, Hess, Flexner, etc.—ciliates, flagellates, schistosoma, and coccidia* organisms capable of producing lesions and symptoms similar to those of amebic colitis.



Fig. 710.—Amebic ulcers of the sigmoid flexure and rectum as they appeared through the proctosigmoidoscope.



Fig. 711.—Amebic pseudomembranous colitis.

The liver is carefully examined in suspected cases because *hepatic abscess* is a frequent complication of amebiasis.

PROGNOSIS

The prognosis is *good* when amebic colitis is recognized and properly treated early, but is *unfavorable* in neglected cases where infection has run an uninterrupted course until the colon and rectum are riddled with mixed infection, ulcers, and fistulæ; the patient is saturated with toxins, is septic, and the liver has become the seat of one or more abscesses. While good results are usually obtained in properly treated cases, one must be guarded in prognosing time required to effect a cure because *virulence* of infection varies and some patients convalesce more quickly than others.

The prognosis is grave when the *liver is infected*, because this usually occurs in chronic cases with marked prostration, and under such circumstances the disease terminates fatally in about 25 per cent. of cases, particularly when liver abscesses are large and multiple.

Recently very good results have followed early operation of hepatic abscesses in patients not greatly debilitated when *incision* and *drainage* of the abscess was reinforced by through-and-through *medicated colonic irrigations* introduced through an *appendical* or *cecostomy* opening.

TREATMENT

Routine measures are impracticable in amebiasis and the treatment must be *prophylactic, supportive, dietetic, medicinal, local, or surgical*, according to indications in different cases, and in some instances several or all of these therapeutic measures are required to effect a cure.

Prophylactic Treatment.—Prophylaxis against entamebic colitis consists in avoiding exposure, violent exercise, arduous labor, unhealthy surroundings, contaminated water and vegetables, improperly cooked food, and unclean toilets, bed-pans, colon tubes, instruments, dishes, or linen, etc., being used by persons suffering from amebiasis, and in screening the excreta, food, and drinking-water from flies.

Supportive Treatment.—Supportive measures unnecessary in *acute* are employed in *chronic* amebiasis to strengthen and build up weakened and emaciated individuals. This is accomplished by having the patient indulge in mild forms of outdoor *exercise, rest* in the house or bed when fatigued and during exacerbations of the disease, avoid worry and hard work, and prescribing a suitable diet and tonics.

Dietetic Treatment.—It is necessary to control the diet during *acute* and *sharp attacks* of *chronic* amebic colitis, but otherwise having the sufferer confine himself to a *rigid* fluid diet is unnecessary and weakening, and the author permits his patients to consume as much mixed food as they can digest, thereby avoiding malnutrition; instead of three full meals, nutritious food is prescribed more often in small amounts.

During acute attacks fluid and semisolid—broths, eggs, albumin, prepared milks, beef extracts, etc.—nutriment is substituted for articles of diet that leave a coarse fecal residue. At other times the sufferer may eat carefully cooked beef, chicken, mutton, vegetable purées, strained gruel, baked potatoes, and other food that does not aggravate his condition, but should at all times avoid

berries, raw fruit, coarse vegetables, alcoholic beverages, cold drinks, and ice-cream.

A more liberal diet is permissible when the bowel is daily irrigated than when the patient is treated by rest and medication. Further discussion of the dietary treatment is unnecessary since it has been fully considered by the author elsewhere.¹

Medicinal Treatment.—Amebiasis is a colonic affection, and no drug retains sufficient potentiality after passing through the stomach and small intestine to destroy all entamebæ, many of which are encysted, though some authorities consider *ipecacuanha* and *emetin* specifics in the disease.

Medical treatment is begun with a liberal dose of castor oil, $\frac{3}{4}$ j (30.0); calomel, gr. v (0.30), or magnesium sulphate, $\frac{3}{4}$ v (20.0), to clear the inflamed bowel of irritating feces, discharge, and débris. When diarrhea, cramps, and tenesmus are troublesome and the patient cannot obtain rest and sleep, an opiate—morphin, gr. $\frac{1}{4}$ (0.015), hypodermically, or opium pill, gr. $\frac{1}{2}$ (0.03), alone or in conjunction with belladonna, gr. $\frac{1}{4}$ (0.15), is prescribed to minimize restlessness, insomnia, peristalsis, enterospasm, and anorectal discomfort. Tenesmus not relieved in this way is controlled by hot saline, starch-water, or oil enemata, or suppositories containing morphin, gr. $\frac{1}{4}$ (0.015), and belladonna extract or cocaine, gr. $\frac{1}{4}$ (0.015), introduced as required.

Antiseptics such as bismuth, salol, or thymol, gr. xv (1.0), administered three times daily lessen suffering—indigestion, diarrhea, and cramps—resulting from fermentation and putrefaction, but are not curative, since their germicidal action is not sufficient to completely destroy all entamebæ. Bismuth taken in large doses for a long time accumulates, oxidizes, and forms putty-like masses that occlude the bowel and irritate the inflamed mucosa.

Astringents—tannalbin, tannigen, tanno-guaiaform, gr. x (0.6), taken every two hours temporarily diminishes frequency and fluidity of stools, and mineral acids and sour wines modify alkalinity of the intestinal content and hinder multiplication of entamebæ.

Tonics—strychnin, arsenic, and iron preparations—are serviceable in debilitated patients suffering from anemia.

Ipecacuanha and Emetin.—*Ipecac* and its chief alkaloidal product, *emetin*, outrank other drugs in the medical treatment of amebic colitis, but in the author's hands these remedies have proved valuable *palliative* but not *curative* agents, though some authorities claim they are specifics in amebiasis. It is not known whether the beneficent action of these agents is due to their power

¹ Gant, Diarrheal, Inflammatory, and Parasitic Intestinal Diseases, p. 378, 1915.

to kill or hinder the multiplication of *Entamoebæ histolytica*, soothing effect on the inflamed and ulcerated mucosa, or tendency to restore tone to bowel.

Ipecac and emetin are useful in *acute amebiasis* and reinfection, but in the author's cases they have not proved effective in the treatment of *chronic colitis*. Ipecac is objectionable since it nauseates the patient, emetin being preferable because it acts more quickly without producing disagreeable manifestations.

In suitable cases these drugs prescribed sufficiently often in liberal doses *temporarily relieve* or *arrest* the dysenteric *symptom-complex*—diarrhea, abdominal pain, blood, mucus and pus in the stools, and tenesmus—employed in conjunction with rest and regulation of the diet, but a *cure* is seldom accomplished with ipecac, emetin, or other *medical agents* except when they are reinforced by *colonic irrigation* and *topical applications* made to extensive ulcers in the sigmoid flexure and rectum.

Better results are obtained when the patient is kept in bed, placed on a fluid diet, and the bowel is cleared by a laxative previous to the administration of these drugs. The dosage must be modified according to indications, and the author prescribes ipecac, gr. xlvi (3 gm.), the first night and thereafter diminishes the dose daily until gr. x (0.60 gm.) is reached and continued until dysenteric manifestations modify or the patient cannot longer take the drug because of nausea and vomiting.

Emetin hydrochlorid is employed hypodermically, beginning with $\frac{1}{6}$ gr. (6.0) the dose is increased to $\frac{1}{2}$ gr. (0.3) and repeated every few hours until $1\frac{1}{2}$ gr. (0.1) have been taken, which is usually sufficient to diminish or arrest cramps, diarrhea, and bleeding within a week. It is advisable to continue emetin in occasional small doses for a few weeks following an apparent cure to prevent a possible relapse.

Local Treatment.—*Direct treatment* of amebic, inflammatory, and ulcerative lesions of the colon and rectum is always effective, for it arrests diarrhea, hemorrhages, and the offensive discharge when employed independently or in conjunction with therapeutic measures already considered.

The local treatment has been discussed under three heads: (1) *colonic irrigation*, (2) *topical applications*, and (3) *fulguration*, measures tending to diminish abdominal pain, frequency of the evacuations, and tenesmus—the most distressing manifestations of amebiasis—through the healing of lesions responsible for the patient's distress.

Colonic Irrigation.—Frequent and thorough cleansing of the

colon and rectum of irritating feces, food remnants, bacteria, toxins, and tissue *débris* is followed by quick and rapid improvement, irrespective of whether or not the irrigant is water, normal saline, or a medicated solution, because the chief benefit from lavage is due to the *mechanical* action of the fluid in washing inflamed mucosa and ulcers free of irritating agents that stimulate peristalsis and prevent healing of amebic and mixed infection lesions.

Colonic irrigations are copious—2 to 6 quarts—given at least twice daily, and must reach all ulcers lying between the ileocecal valve and anus to be effective. The irrigant is employed *warm*, for when *cold* it stimulates enterospasm and is promptly evacuated.



Fig. 712.—Radiograph showing how forcible introduction of the long colon tube causes it to coil upon itself in the rectum, which prevents the irrigating solution from passing into the upper colon.



Fig. 713.—This radiograph demonstrates that it is often impossible to introduce a long tube into the colon though it is projected through a sigmoidoscope previously inserted into lower sigmoid flexure.

Irrigation is unsatisfactory unless the patient is placed in a convenient and suitable posture—Sims', recumbent, knee-chest, or inverted (Fig. 715)—while the fluid is being introduced, and his position is frequently changed while the colon is being massaged to insure the irrigant coming in contact with diseased mucosa in all segments of the large intestine and rectum.

Long colon tubes should not be employed, since they often *curl* in the rectum or sigmoid flexure (Figs. 712, 713), induce pain, cause a desire to stool, and the solution often fails to pass through them because of kinking.

Enemata and irrigating solutions are readily introduced by means of the author's funnel-shaped proctoscope and pitcher

(Fig. 715) or through a Gant (Fig. 722), or Kemp two-way irrigator double rubber tubes of the Murray or Jelks type, or with the aid of a short colon tube and an attached funnel (Fig. 714). Best results are obtained when copious irrigations (3 to 6 quarts—3-6 liters) are employed twice daily, and treatments are decreased as colitis improves.

Irrigants.—Normal saline and moderately weak solutions of ichthyol, boric acid, balsam of Peru or argyrol (2-5 per cent.),



Fig. 714.—Method of irrigating the colon and rectum with a two-way irrigator.

and Jelk's formalin combination have proved effective irrigants in the author's cases of amebiasis. When ulceration is extensive and hemorrhage frequent the colon is irrigated once with a quart (1 liter) of water containing silver nitrate, gr. xxx (2.0), and thereafter daily for a week with the same agent diminished in strength by one-half.

When diarrhea has improved and discharges have been decreased the colon is flushed with a 2 per cent. ichthyol or boric acid

4 per cent. solution, which are soothing and tend to heal the inflamed mucosa. In obstinate cases when stools are offensive they are deodorized by washing out the colon with a hydrogen peroxid 10 or ichthyoil 5 per cent. solution.



Fig. 715.—Method of filling the colon with oil or solution by means of Gant's funnel pitcher and funnel proctoscope while the patient is in the inverted posture.

If stimulating agents aggravate the condition, flax-seed or methylene-blue irrigations or the accompanying oil emulsion are employed because of their soothing action on the inflamed and ulcerated mucosa:

R.	Olive oil.....	0j	500|0;
	Orthoform.....	5ij	80;
	Bismuth subnitrate.....	5j	300.—M.

Sig.—Shake, warm, and inject 5ij (90.0) or more into the colon, and permit it to remain in the bowel over night.

Haines and the author have derived good results in the treatment of amebic colitis through the employment of high coal-oil enemata treatments. The author's *funnel pitcher* (Fig. 716) and *funnel proctoscope* (Fig. 715) are convenient for this purpose when the patient is placed in the inverted posture (Fig. 715).

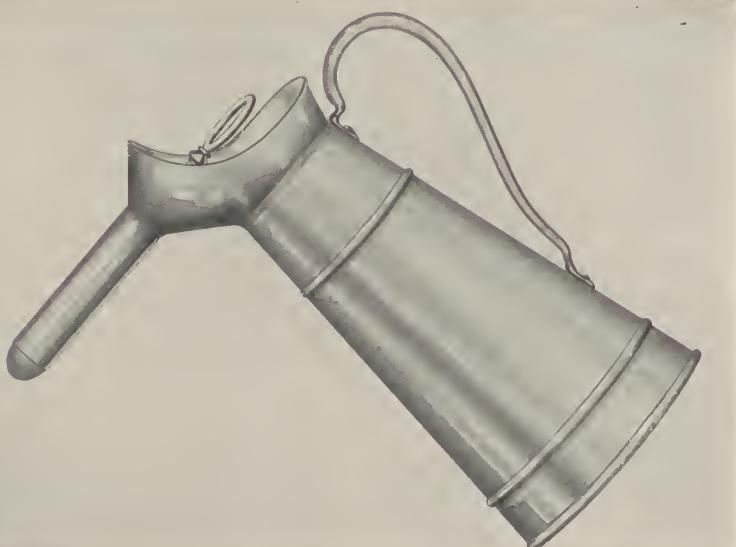


Fig. 716.—Gant's combined funnel proctoscope and pitcher employed for pouring oil or solutions directly into the colon with the patient in the knee-chest or inverted posture.

Topical Applications.—Usually a cure is hastened by introducing a proctosigmoidoscope and making topical applications to extensive sluggish ulcers or mopping the inflamed bowel with ichthyol, balsam of Peru, or silver nitrate (6 per cent.). Acids are unnecessary and contraindicated because of their tendency to spread and injure surrounding healthy tissue and cause sharp pain.

Fulguration.—Where medicated irrigations and topical applications have failed, the author has succeeded in healing sluggish ulcers and destroying complicating papillomata and polyps by fulgurating them through a proctoscope, and subsequently treating lesions with a mild ichthyol or silver nitrate solution.

Surgical Treatment.—Amebic colitis becomes a surgical disease

as soon as rest, dieting, medication, and colonic irrigation *per anum* fail to control diarrhea, arrest hemorrhage, and heal the rectocolonic ulcers.

The author's results from *appendicostomy* or *cecostomy* and *colonic through-and-through irrigations* have been remarkably good, and he resorts to these procedures promptly when *non-surgical measures* do not immediately control the infection. The author has never failed to benefit dysenteric colitis by these methods except when the ileum was infected or amebiasis was complicated by another local or general disease, but greatly weakened and emaciated patients convalesce slower than those afflicted with amebic colitis for only a short time.

Shortly following *appendicostomy* (Figs. 1006, 1010), *cecostomy* (Figs. 994, 999), and *Gant's ileocecostomy* (Figs. 889, 993) and inauguration of *through-and-through* medicated irrigations the number of daily evacuations diminishes, bleeding is rare, discharge lessens, digestion improves, and the patient rapidly gains in weight, sleeps better, loses his sallow complexion, and begins to feel as if a cure were being accomplished.

When there is no improvement from irrigations the patient's posture should be repeatedly *changed* during treatment that the solution may reach lesions on *all sides* of the colon and rectum.

Cecostomy and *appendicostomy* are practically devoid of danger and are indicated early when other measures fail to promptly arrest amebic colitis.

The irrigants recommended in the non-surgical treatment given on p. 541 are employed in the same strength following *appendicostomy* and *cecostomy*. By using from 2 to 4 quarts of the solution and letting it enter the appendical or cecal opening and pass out through a perforated self-retaining anal dilator (Fig. 1020) the inflamed and ulcerated colon and rectum are quickly and thoroughly cleansed of irritating feces, toxins, mucus, pus, blood, and tissue *débris*.

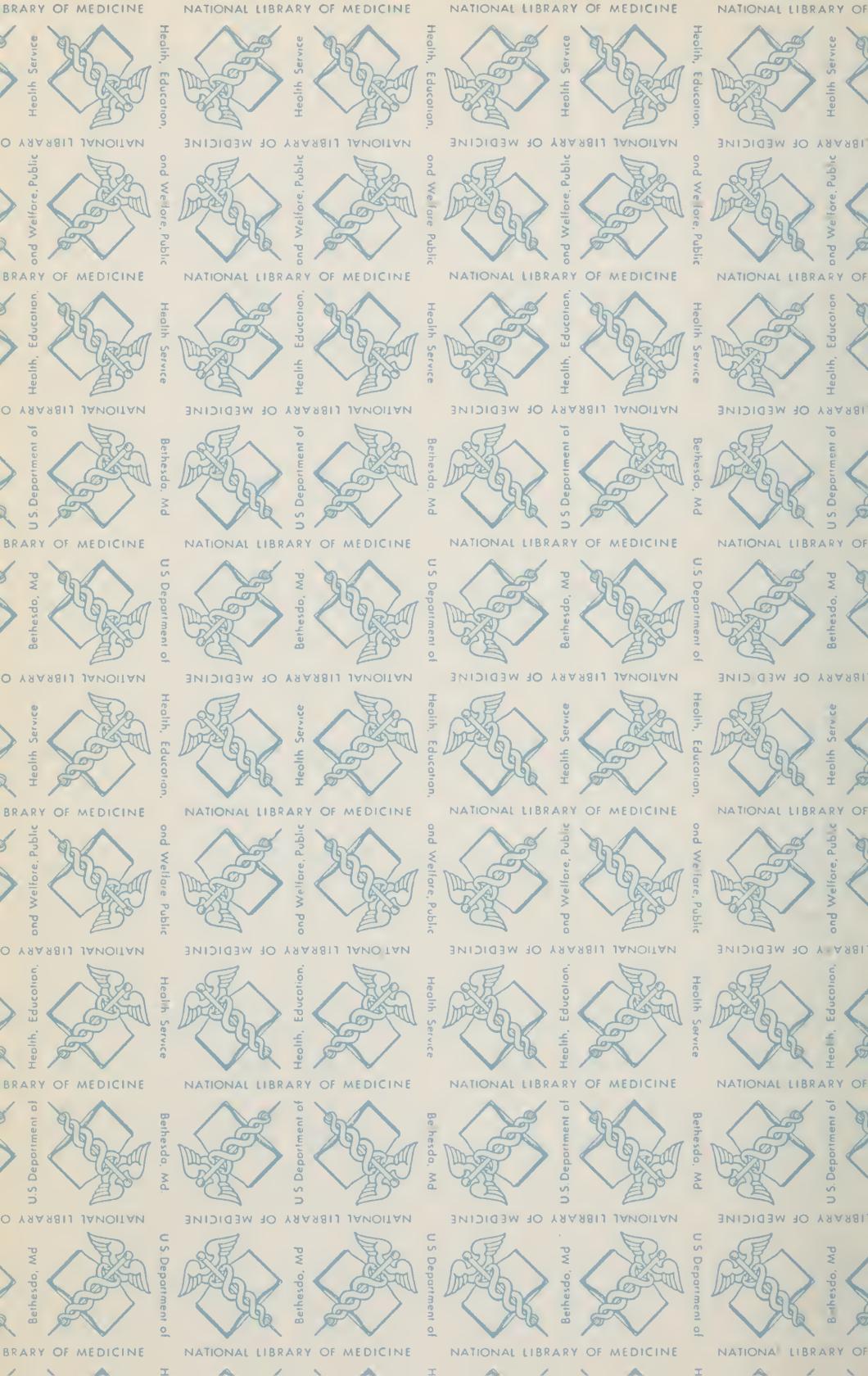
The indications for and technic of performing *appendicostomy*, *cecostomy*, and *Gant's ileocecostomy*—which provides a means of *simultaneously* or *separately* irrigating the colon and small intestine—operations most frequently resorted to in the treatment of amebic colitis and ileocolitis, have been fully discussed and illustrated in Chapter XCIII.

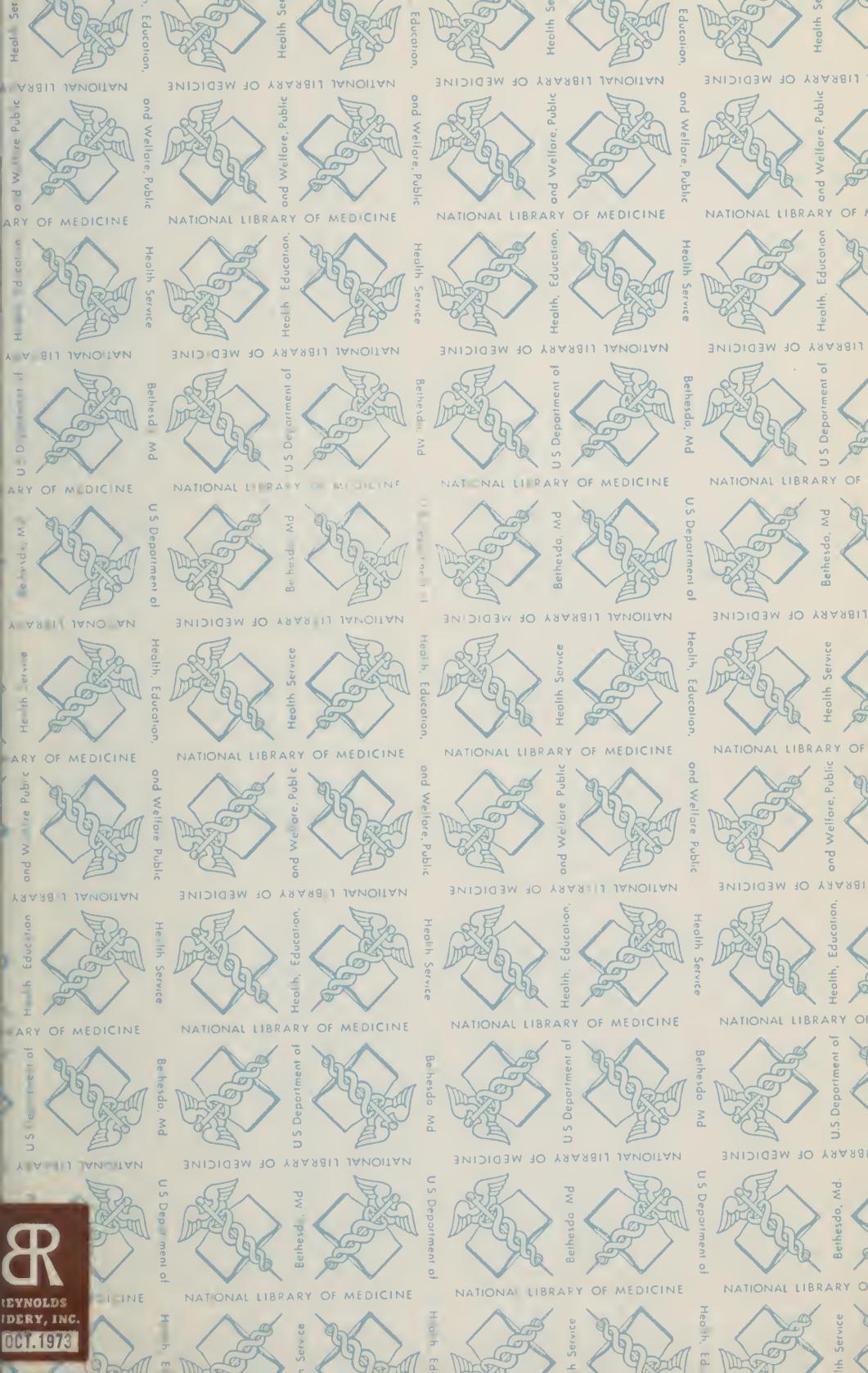
Enterostomy and *colostomy* (see Chapter XCIV), formerly employed, are now seldom resorted to in the treatment of amebiasis, because the patient objects to an anus in the abdomen and serious abdominal operation necessary to subsequently close the opening.

The author performs these operations only in extreme cases, where the bowel is riddled with lesions, appendicostomy or cecostomy, colonic irrigations, and other measures have failed, and it is imperative that feces be prevented from passing over the diseased bowel.

Intestinal exclusion—*ileosigmoidostomy* (see Chapter XCV)—is preferable and is substituted for enterostomy and colostomy even in deplorable cases, for it is devoid of their objectionable features, minimizes infection, and puts the bowel at rest.

Colectomy (see Chapter XCII) is seldom required in the treatment of amebic colitis, but is indicated in neglected cases where the mucosa has *sloughed* extensively, is dotted throughout with *polyps*, *strictures* have formed, or the colon is markedly distorted, compressed, twisted, or angulated by massive pericolic *adhesions*, lesions that permanently impair colonic functions.





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